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ABSTRACT

This monograph on teacher labor market research is divided into six major sections. The first, a survey of related literature, describes the general context of teacher labor market research derived from the educational reform movement and then focuses on the particular issues of supply adequacy, teacher quality, career choice, attrition, and compensation. Following the literature survey, four sections summarize the results of research under four major topic areas: (1) supply and demand monitoring and forecasting; (2) career choice and recruiting; (3) attrition; and (4) compensation. Individual research project components are discussed as subheadings under each major topic. The final section is a synthesis of the findings of the various research components which includes a discussion of policy implications and a summary of future research needs. Fourteen pages of references conclude the report. (JD)

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Selected Monographs in Educational Policy Research

Number 3

The Dynamics of the Teacher Labor Market in the Southeast

by
Ronald Bird
Barnett Berry
Stratford Douglas
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November 1985

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Errata

Page 43: Explanation of Variables Used on Table 2 should show:

PREDWAGE	Predicted yearly earnings (opportunity wage)
PRINCIP	Ratio of principals plus assistant principals to teachers

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Page 58: Table 8: Example of Simulation with Higher Salary (below) replaces duplicate Table 7.

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To all of those named and to the numerous others in state agencies and local schools across the Southeast who helped and encouraged this research, the authors are indebted. As is customary to point out, this expression of appreciation for help does not convey any guilt by association for the conclusions drawn, nor blame for the errors that remain.

Preface

This monograph describes the teacher labor market research initiative conducted by the Southeastern Regional Council for Educational Improvement during the period January 1984 through June 1985. This work was undertaken to develop an understanding of the existing research regarding the teacher labor market and to conduct original research on those specific areas within the topic that seemed important, but were not examined extensively by previous research. Those areas included career choice and recruiting, teacher attrition, and earnings comparability.

The research project has been conducted under the general design and supervision of Ronald Bird. Barnett Berry assumed responsibility for the three qualitative research studies of the project. Stratford Douglas developed the econometric model of teacher supply. Bird conducted the studies of state market forecasting efforts, teacher pay comparisons, and empirical surveys of turnover and earnings expectations and compiled the synthesis of project results. Steven Sciscento developed the employment and earnings data sets that served as the basis for both the teacher pay and supply model research areas. Serving as subcontractors, Patrick Cotter and Betty Hardee have researched teachers' supplemental employment in Alabama, and Rodney Mabry and his associates have conducted research on fringe benefits for teachers.

The context of the research was the Southeastern Region. Despite the regional focus, many of the research findings also have nationwide relevance. This report presents new research findings in several areas: empirical estimates of competitive salary levels for teachers, turnover rates, and teacher supply forecasts for the region. It presents new qualitative perspectives regarding career choice processes, recruiting, and causes of teacher attrition. It presents new and important evidence of distorted earnings expectations of students that bias career choices away from teaching.

Dynamics of the Teacher Labor Market in the Southeast

SECTION ONE: PROJECT DESCRIPTION

Introduction

America is in the midst of a period of education system examination and reform. This period is a window of opportunity for meaningful change in one of this country's largest, oldest, and most change-resistant institutions. Whether meaningful change will in fact occur is not yet clear. In the past, similar movements have sometimes resulted in benefit and improvement; sometimes nothing significant has happened.

As in the past, a central figure in the debate and proposals for reform is the teacher. The concerns about teachers involve two related issues: quantity and quality. There is concern that this nation may be facing a possible shortage of teachers, especially in curriculum areas such as mathematics and science that education reform forces believe must be improved and expanded. There is also concern that the quality of the existing and emerging future teacher labor force is less than adequate to produce the calibre of educational outcome that is necessary for the future economic and cultural prosperity of the nation. The success or failure, then, of the current school reform movement hinges on the adoption of policies to affect the size and skills of the teacher work force. Development of such policies requires understanding the forces affecting the teacher labor market and the interaction between the teacher labor market and the other labor markets that compete for talented and educated people.

It is important to recognize the significance of the size of the teacher labor market. In the southeastern states, a total of 507,045 persons were employed as public school teachers in 1983. Table 1 shows the teacher employment total for each state in the region. The number is almost 10 percent of the estimated total college-educated population of the region. Policies affecting the teacher market touch the lives of tremendous numbers of people.

Table 1

Total Public School Teacher Employment in the Southeast and Average Salaries by State for 1982-83

State	Total Teachers Employed	Average Teacher Salary
Alabama	39,400	$17,900
Arkansas	23,505	$15,029
Florida	82,008	$18,538
Georgia	57,016	$15,900
Kentucky	32,200	$18,384
Louisiana	42,499	$18,400
Mississippi	24,842	$14,320
North Carolina	55,261	$17,801
South Carolina	32,030	$16,430
Tennessee	39,233	$17,697
Virginia	56,892	$18,535
West Virginia	22,159	$17,322
Regional Total	507,045	$17,463

Development of Research Project

The Council's research initiative concerning the teacher labor market began in 1984 with a review of state and national efforts to monitor and forecast teacher supply and demand (Bird, 1984). The original impetus was to aid state education agencies to assess the dimensions of supply and demand imbalances overall and for certain categories of teachers, i.e., the emerging shortage of mathematics and science teachers. The initial investigation quickly led to the realization that the development of effective policies to recognize and correct supply and demand imbalances in the teacher labor market would require a thorough understanding of all aspects of the market. The study was expanded to investigate the process of career choice between teaching and other occupations, the problems and practices of teacher recruiting by collegiate education schools and by local school districts, and the comparability of teacher compensation to other occupations. The research was further broadened to explore the important issue of teacher retention: the size of turnover rates, reasons for leaving, and where resigning teachers go. The original desire to provide empirical forecasts of teacher supply and demand trends in the Southeastern Region was continued and developed into a preliminary econometric model of regional teacher labor supply. Figure 1 shows the structure and organization of the research

Figure 1

Organization of Research

Topic	Elements	Investigator
Supply and Demand Monitering and Foreccasting	Review of Forecasts	Bird
	Econometric Supply Model	Douglas and Bird
Career Choice and Recruiting	Case Study: Choice/Recruiting	Berry
	Case Study: Nonteaching Majors	Berry
	Student Earnings Expectations	Bird
Attrition	Case Study: Resigned Teachers	Berry
	District Turnover Survey	Bird
Compensation	Pay Comparison Model	Bird and Sciscento
	Supplemental Earnings	Cotter and Hardee
	Fringe Benefits	Mabry, et al.

and indicates the investigators involved in each part of the project.

This monograph represents the culmination of the Southeastern Regional Council teacher labor market research initiative. Further work, however, may be undertaken by the Southeastern Educational Improvement Laboratory. The monograph provides a synthesis of the various elements conducted, including some research findings not published previously. In addition, this monograph provides some conclusions and policy recommendations that integrate the various research parts.

Several papers have already been published that detail individual elements of the research project. The previously published reports are:

Ronald Bird, Report and Evaluation of Current Information Regarding Teacher Supply and Demand.

Barnett Berry, A Case Study of the Teacher Labor Market in the Southeast.

Barnett Berry, A Case Study of Teacher Attrition in a Metropolitan School System in the Southeast.

Patrick Cotter and Betty Hardee, Supplemental Employment Among Alabama Teachers.

Ronald Bird, An Analysis of the Comparability of Public School Teacher Salaries to Earning Opportunities in Other Occupations.

Stratford Douglas and Ronald Bird, Personal Labor Supply: An Estimation of a Probabilistic Teacher Labor Supply Function.

This monograph contains descriptions of the research and results reported in the previous publications. Readers interested in full description of methodology, survey of specialized literature, and full discussion of findings should examine the individual reports. Additional papers in preparation and planned for publication are:

Rodney Mabrey, et al., A Study of Teacher Fringe Benefits. RBM Research, Inc.

Barnett Berry, A Case Study of College Students Who Do Not Choose Teaching as a Career.

Barnett Berry, Further Case Studies of Teacher Attrition.

Some preliminary information from those future publications is also included, as well as the findings of two empirical research projects conducted by Bird that have not been reported.

One is a survey of local school district teacher turnover rates. The other is a survey of the earnings expectations of college students for various occupations.

Outline

The monograph is divided into six major sections. The first, a survey of related literature, describes the general context of teacher labor market research derived from the educational reform movement and then focuses on the particular issues of supply adequacy, teacher quality, career choice, attrition, and compensation. Following the literature survey are four sections, each of which summarizes the results of Council research under one of the major topic areas shown in Figure 1. The major areas are: Supply and Demand Monitoring and Forecasting, Career Choice and Recruiting, Attrition, and Compensation.

Individual research project components are discussed as subheadings under each major topic. The final section is a synthesis of the findings of the various research components. That section includes a discussion of policy implications and a summary of future research needs.

One omission requires note and explanation. No separate heading is included for the teacher quality issue. It was the original intent that the Council's teacher labor market research initiative include a section on questions relating to teacher quality and productivity. The limitations of time and resources prevented the implementation of that part of the research design. However, the issue of teacher quality has been addressed, at least tangentially, within the context of some of the other components. In particular, the case studies conducted by Berry provide insights into the multiple facets of the teacher quality issue. The concluding section includes description of research problems regarding the teacher quality issue in the discussion of future research needs.

SECTION TWO: GENERAL LITERATURE SURVEY

The Current Educational Reform Movement

The classroom teacher is the critical element in the educational process, and efforts to reform or improve the public school systems typically have focused on the need to ensure an adequate supply of highly motivated, competent, and effective teachers. Of the eight reform reports issued by various national groups in 1983, every one included teaching as one of the target areas for policy action and reform. According to one review of the reports, "The teacher and teaching emerge as fundamental issues . . . . Many see reform in this area as critical to all other improvement efforts" (Northeast Regional Exchange, 1983, p. 8).

The concerns expressed by education reform advocates involve both the quantity of teachers and the perceived quality of teachers. The report of the National Commission on Excellence in Education, "A Nation at Risk" (1983), placed teaching improvement in the premier position for education reform. The Commission found that "not enough of the academically able students are being attracted to teaching; that teacher preparation programs need substantial improvement; that the professional working life of teachers is on the whole unacceptable; and that a serious shortage of teachers exists in key fields" (National Commission, 1983, p. 22). The Commission recommended that seven steps be undertaken to improve teaching (National Commission, 1983, p. 30). These included: higher educational requirements, demonstrated aptitude for teaching and demonstrated competence in a discipline; increase of teacher salaries to professionally competitive, market-sensitive, performance-based levels, with salary, promotion, tenure, and retention tied to effective evaluation; adoption of 11-month contracts and more adequate compensation for teachers; development of career ladders for teachers; adoption of innovative recruiting and hiring practices to alleviate the shortage of mathematics and science teachers; availability of incentives, such as grants and loans, to attract capable college students to teaching; and utilization of master teachers in the design of teacher preparation programs and the supervision of probationary teachers (National Commission, 1983, p. 31). All of the reports have placed emphasis on the need to ensure an adequate supply of science and mathematics teachers.

It is noteworthy that the educational reform movement has not been born of a concern for education per se. In the National Commission report and others, the focus was upon education as a means to economic growth and prosperity for the nation. This basis for reform proposals was most evident in the Hunt Commission Report issued by the Education Commission of the States' Task Force on Education for Economic Growth (1983). That report clearly defined the context for education reform:

> Technological change and global competition make it imperative to equip students in public schools with skills that go beyond the "basics." For productive participation in a society that depends ever more heavily on technology, students will need more than minimum competence in reading, writing, mathematics, science, reasoning, the use of computers, and other areas (p. 8).

The concern for adequate supplies of mathematics and science teachers is consistent with the economic basis of the reform movement because those elements of the curriculum are most relevant to the scientific and technological fields that are perceived as the focus of future economic growth. A secondary theme of the reform movement, but one that has gained importance since William Bennett assumed the leadership of the U.S. Department of Education, is the need to improve education in the humanities and in critical thinking skills. This theme, too, can be viewed as consistent with the economic basis for the reform movement if one understands the role of creativity and imagination in developing new technologies.

Underlying the contemporary educational reform movement seems to be a view of America's role in the global economy that is quite different from the role that America has played in the past. Previously, America was viewed as a production center, drawing upon great stores of natural resources and a skilled and disciplined work force to produce goods for both an affluent domestic market and the world market. The view of America's future that is suggested by the contemporary discussion is that of an intellectual center for a fully integrated world economy. That view was implicit in the National Commission's call for creation of a learning society: "In a world of ever-accelerating competition and change in the conditions of the workplace, of ever-greater danger, and of ever-greater opportunities for those prepared to meet them, educational reform should focus on the goal of creating a Learning Society" (National Commission, 1983, p. 13). As another report stated:

> The central objective of the United States for the remainder of the decade must be to improve the ability of American industry and American workers to compete in markets at home and abroad. The new economic realities of global competition demand a broadly based national effort to make this possible . . . . Citizens [must] recognize that industrial competitiveness on an international scale is the key to economic growth and . . . appreciate that the overall well-being of society itself depends on such economic growth (Business-Higher Education Forum, 1983, p. 1).

The United States, it is hoped, will increasingly serve as the research, design, development, and management headquarters for a global network of productive activities. Most of the actual manufacturing activities will take place elsewhere, in places like Korea, China, Thailand, and Central America. The United States will be more likely to maintain its position of relative affluence in the world by concentrating on the highly valued economic service functions of management, design, planning, research, information, and financial services, while the low-paying, low-skilled jobs of manufacturing and assembly are left to others in low-wage nations.

This vision of America's economic future implies different performance expectations for the public schools than previously was the case. It means that the schools must produce a higher proportion of knowledgeable, creative, and innovative intellectual leaders than was sufficient in the past. The challenge is not simply to better educate our elite. "We must raise both the floor and the ceiling of achievement in America" (Education Commission on the States, 1983, p. 18).

In reaction to the education reform advocates, some individuals and groups (such as the NEA) have attempted to defend the status quo by arguing that schools today are no worse (and maybe better) than in the past. Such reactions have correctly pointed out that public schools fulfill a variety of educational and social responsibilities today better than ever before. While correct, that defense misses the real point of the reform movement by focusing on comparisons to the past. The important issue raised by reform advocates is not merely that the schools have declined in their ability to perform the tasks that were asked of them in the past. Rather, it is implied that the educational system established in response to past needs is no longer adequate to fulfill the perceived needs of the future.

This interpretation of education reform issues is relevant to the discussion of the problems of the teacher labor market. Viewed from this perspective, the question of whether teacher quality has declined in recent years is moot. The real issue is whether or not the teacher work force, which may have been adequate to fulfill the prior needs of industrial America, will be adequate to prepare a generation of innovative, creative, and inquisitive minds that America will need to manage the emerging world economy.

It is in this context of a perceived need for educational improvement that the advocates of education reform have offered a series of specific policy recommendations intended to develop a more skilled and productive teacher labor force. The recommended strategies have included large pay increases, career ladder and merit pay incentive systems, teacher competency testing, and various revisions of teacher training and certification programs.

Unfortunately, much of the discussion of teaching improvement strategies seems to be uninformed by the history of education reform movements. This failure to learn from history creates the danger that current efforts to reform the teaching profession and alter the dynamics of the teacher labor market may repeat costly errors of the past. Weaver (1979, 1983) has described the cyclical nature of teacher labor market crises and their relation to education reform movements. He described the themes of today's debate as repetitions of events that have occurred at least four previous times this century. Weaver interpreted the concern for teacher assessment, certification, and other quality assurance measures as economic entry-barrier devices resulting from surplus conditions in the teacher labor market (Weaver, 1983, p. 23). Freiberg (1984-85) has reviewed the history of career ladder and merit pay plans and, like Weaver, saw in the current reform movement repetitions of earlier proposals and programs. He described the lessons that current reformers could learn from that history. Important among those lessons was the principle that incentive plans be viewed as practical, necessary, and credible by teachers themselves. History indicates that without teacher support such strategies for quality improvement will fail.

The Quantity of Teachers

Much research has focused on the question of whether there will be enough teachers of even minimal ability to fill projected demands. Many state departments of education compile annual reports of teacher supply and demand. The National Center for Educational Statistics has published a series of reports dealing with various teacher supply issues and forecasts. The National Education Association publishes an annual report on teacher labor market conditions. In addition, special reports and studies have been issued by numerous organizations in recent years. This section summarizes the findings of some of those reports.

"Shortages of qualified teachers in subject areas such as mathematics and science are expected to grow over the next few years into a more generalized teacher shortage as enrollments increase and the supply of prospective teachers continues to shrink" (Darling-Hammond, 1984, p. 1). Even if expected enrollment growth does not materialize in the 1990s, conditions of teacher shortage could result from expanded curriculum demands of a high-technology economy and from the end of the school employment hegemony over the female labor force. It is expected that by 1988 the supply of new graduates prepared to teach will satisfy only 80 percent of the demand for new teachers (Darling-Hammond, 1984, p. 6). The declining appeal of teaching to new labor market entrants has been traced to various factors. Low pay relative to other occupations is the most frequently referenced cause (National Commission, 1983; Weaver, 1984; Schlechty and Joslin, 1984). Other factors discussed include working conditions, state certification and licensure policies, lack of social prestige for the occupation, and lack of personal autonomy (Council of Chief State School Officers, 1984; Schlechty and Vance, 1981; Lortie, 1975).

At present, a number of sources of regularly compiled teacher supply and demand information are available to state education agency planners and administrators. At the national level, there are three major sources of information: the National Center for Education Statistics, the National Education Association, and the Association for School, College, and University Staffing. Each collects data in a different way and presents the data in a unique format. At the state level, eight of the twelve Southeastern Regional Council member states report that they collect and publish information regarding teacher supply and demand. The other member states collect some teacher supply and demand information, but do not issue formal reports. The nature of the information collected and the format of the reports vary widely from state to state.

The reports issued by the National Center for Education Statistics are an important source of reliable data that is presented in a useful format and appropriately interpreted. The recent NCES reports include: New Teachers in the Job Market (1980), Projections of Education Statistics to 1988-89 (1981), Projections of Education Statistics to 1990-91 (1982), New Teachers in the Job Market, 1981 Update (1983), and reports derived from the 1979 and 1980 NCES "Survey of Teacher Demand and Shortage" (1981 and 1982). The NCES reports include estimates of placement rates for beginning teachers (1980, p. 6) and estimates of the demand for new teachers in the near future. Although the NCES data are published with an eighteen to twenty-four-month time lag, they tend to include much detail, especially in terms of categorization of demand and supply for teachers in both the public and private education sectors. Much of this information is not found in any other national or state report. Based on their 1978 survey of the 1977 graduating class (1980, p. 9), NCES showed that 77 percent of new teacher graduates actually applied for teaching jobs in the year following graduation and that 77 percent of those applicants subsequently accepted teaching positions.

The 1981 update of the NCES study found that the application rate had risen to 85 percent, but that the percentage of applicants who accepted positions had fallen to 75 percent. The findings also indicated the end of the teacher surplus that characterized the 1970s and the beginning of a future cycle of teacher shortage:

> According to five measures of employment status, the 1979-80 bachelor's recipients newly qualified to teach fared better in the labor market in May 1981 than all other 1979-80 bachelors's graduates as a group. Proportionately, the former participated more in the labor force, were more frequently employed full-time, more frequently held jobs in fields closely related to their majors, had a lower unemployment rate, and less frequently worked in nonprofessional, nonmangerial, nontechnical jobs (New Teachers in the Job Market, 1983, p. 1).

These findings suggest that the shortage of teachers in special education, elementary education, and mathematics, which is currently the focus of attention, was already emerging in the late 1970s. The manner in which the previous general surplus of teachers was reported and emphasized may have contributed to the present shortages of teachers in specialized areas by adversely influencing career decisions of college students who might otherwise have chosen specializations that are now identified as critical needs.

One of the strengths of the NCES approach to teacher labor market analysis is the recognition that demand for teachers is not solely a reflection of enrollment trends. The NCES reports seem to recognize that the demand for teachers is a complex phenomenon that reflects changes in educational services (like special education and kindergarten programs), changes in educational practices (like the adoption of smaller class sizes), and changes in the financial constraints facing schools.

By logical extension of the recognition of the complexity of the problem, one can infer that the decline in teacher demand after 1977 may not be attributed solely to enrollment decline, but also to the effect of economic recession and high inflation rates, which constrained public sector budget options. Improved economic growth prospects during the mid-to-late eighties may open new possibilities for teacher demand to expand, regardless of revenue growth.

The NCES projections show that the total demand for teachers will continue declining until 1984, at which time it will reach 2.38 million (Projections of Education Statistics, 1982, p. 71). After 1984, teacher demand will increase annually toward a 1990 total of 2.64 million. This translates into an average demand for new teachers of 43,000 annually in addition to the number needed to replace teachers who die, retire, or leave the field. The NCES projections do not include any significant change in the relative size of the public and private education sectors or in the present distribution of teacher demand between them.

It is expected that the supply of new teacher graduates will decline from the 1980 NCES estimate of 159,000 to 129,000 in 1985, unless raises in teacher salaries increase the proportions of present college students planning to prepare for teaching ("Projections of Education Statistics," 1982, p. 6). To make up for the projected decline in the number of new teachers, a larger proportion of applicants will have to be recruited out of the reserve pool of former teachers and previous education graduates who have been working in other fields.

Concern About Teacher Quality

Critics of public education lament that many teachers cannot teach and that many of those who can teach do not remain in the profession, choosing instead other careers that offer greater remuneration and prestige. The recent Rand Corporation study reported that "the most academically able recruits to teaching leave the profession within a very short time"

(Darling-Hammond, 1984, p. 1). Weaver (1984), Schlechty and Vance (1981, 1983), and others have pointed to evidence of below-average or declining academic achievement of persons entering teaching compared to other occupations.

The discussion of teacher quality has generally identified "quality" with measures of the academic ability of teachers. Those who perceive declining quality (Weaver, 1983; Darling-Hammond, 1984) in the the teacher labor force have referred to measures of academic preparation and performance. Some defenders of the status quo have challenged the emphasis on academic performance, citing the need for motivation, love of children, and patience as important characteristics of effective teachers. Surprisingly, no recent research has been found that attempts to define educational productivity in terms of empirical student outcomes and to relate outcome to measurable teacher characteristics. Lacking such research, the discussion of teacher quality seems to revolve around a specious concept. The association of academic preparation with teacher performance is a hypothesis that should be tested.

Many critics have associated perceptions of poor teacher quality with the reputation of college educational programs for lax standards and empty course content. Feistritzer has summarized the situation succinctly:

> Far too many teacher education programs today accept anybody and everybody who harbors the slightest aspiration to

> teach. No assessment of qualifications takes place at entry or exit from such programs, and courses offered are ill-defined and often impractical. All such programs should be summarily shut down (Feistritzer, 1984, pp. 59-60).

A study of college student transcripts conducted by the Southern Regional Education Board arrived at similar conclusions (Galambos, 1985). That study found that education curriculum majors devote less time to liberal arts, mathematics, and "the basics" than graduates in other fields. The report recommended that teacher licensing requirements be changed to allow liberal arts majors to enter teaching. It recommended that pedagogical specialization courses be confined to graduate-level programs.

Weaver (1983) has developed a theoretical explanation of the decline of apparent academic ability of teachers. He explains the decline as a part of the dynamics of the cycles of shortage and surplus that have characterized the teacher labor market. The surplus of teachers in the 1970s, according to Weaver, resulted in academically able college students, who possessed alternative career opportunities because of their ability, choosing nonteaching occupations. Less able students had fewer nonteaching alternatives and so tended to remain in teacher preparation programs. Weaver added an additional factor to his model of declining academic ability of teachers. He argued that the growing concentration of low-ability students in teacher preparation programs and the lowering of grading standards by teacher training program professors further discouraged academically able students from entering teacher preparation.

Public perceptions of the poor quality of the teaching work force are not new in the United States. Waller (1932) and Koernor (1963) characterized teachers as having lower academic achievement and aptitude than their counterparts in other occupations. Quality issues have only recently attracted widespread attention because previously "quantitative issues (assuring an adequate supply of teachers) were so overwhelming that serious consideration of qualitative issues was often sublimated or given secondary importance" (Schlechty and Vance, 1982, p. 2).

Policy Recommendations To Improve Teaching Quality and Attractiveness

Dissatisfaction with the perceived quality of the teacher labor force has been used as the basis for policy recommendations that focus on teacher improvement as a key strategy for school improvement. Paramount among these have been career ladder and merit pay plans (Schlechty and Joslin, 1984; ASCD Task Force, 1985). Whether or not such plans will work has been a major subject of debate. The Association for Supervision and Curriculum Development (ASCD) report characterized the failure of past efforts to implement incentive pay plans as the result of their not being comprehensive enough and of preserving too much of the status quo in the existing school organization. That report concluded:

> Systematic change is a necessary but not sufficient condition for school reform success. Management that promotes success is just as crucial. Schools are not managed in ways that promote excellence. A compensation program, which is only one element of the total management system, must be appropriate to and allied with effective management, and any adjustments in compensation will not be fully effective unless faulty management characteristics are also corrected (ASCD Task Force, 1985, p. 12).

Out of the debate is emerging a consensus that teaching is a complex set of activities, that defining and measuring teacher quality and performance can never be a simple process, and that workable strategies for improving teaching will require broad support and careful implementation.

Mobility and Attrition Issues

Significant research has focused on teacher mobility and attrition issues. The research questions addressed have included lateral and vertical movement within the field as a career pattern and movement out of the field. Bloland and Selby (1980) reviewed research on teacher mobility and categorized variables of teacher satisfaction, attrition, and turnover into three causative areas: demographic, professional and personal, and school-related factors. They concluded that "male teachers are more likely to change than females, with single males the most mobile. Single women are less mobile than men and more likely to leave teaching than married women." They found "no apparent relation between educational attainment and teacher mobility" (Bloland and Selby, 1980, p. 23). The relevance of much of the recent mobility and turnover research is questionable.

> Most of the research has been carried out through sample survey techniques, and the reasons given for leaving teaching most frequently were assumed to be causes of turnover . . . . Little attention has been given to the comparison of teacher turnover among various school communities and to turnover experiences in other occupations. (Berry, 1984, pp. 9-10).

Charters (1967, p. 193) aptly summarized the state of teacher mobility research:

> Investigators persist in tracing all teacher turnover to working conditions of the school as though they had never heard of marriage and the family. It is clear to me that the obvious facts about the teaching career are not so obvious after all.

The teacher shortages of the 1950s and early 1960s prompted numerous investigations to uncover the motivations of those aspiring to teach. Fielstra (1955) and Richards (1960) found that former teachers have the most influence on students' decisions to become teachers. Haubrich (1960) found job security to be the most significant determinant. Wright (1977) reaffirmed the role of former teacher influence. Schlechty and Vance (1982, 1983) have identified aspiration to teach with sex stereotype roles, lower than average concern for income, and greater than average concern for job security. Research on the initial career choice of teachers has emphasized the importance of the occupation as an avenue of upward mobility for young people whose alternatives may be limited (Lortie, 1975). Consequently, the opening of more career alternatives for women and minorities causes teaching to become a less likely career choice for these groups. These new avenues for women and minorities have been cited as reasons for schools to devote more attention and resources to recruiting people into the profession (Hopfengardner, et al., 1983, p. 10). Education policy makers must begin actively to sell the teaching profession to young people instead of passively taking whoever happens to walk in the door.

SECTION THREE: SUPPLY AND DEMAND MONITORING AND FORECASTING

Context of the Project

The need for accurate and detailed analysis of teacher labor market conditions is particularly critical at the present time since both the teacher markets and the general educational establishment are entering a period of change. The apparent surplus of teachers that characterized the 1970s has been replaced by a shortage of teachers in math, science, and special education. There is the likely prospect of a general teacher shortage in the near future. Changing technology, changing life styles, and changing career opportunities for college graduates--especially women and minorities--have combined to alter the traditional patterns of teacher supply and demand.

To cope with the changes and pressures that are affecting education today, policy makers can benefit from a broad range of information derived from a comprehensive labor market analysis. There are many ways in which the results of teacher supply and demand data and analysis can be useful to education decision makers: (1) data regarding changes and causes of teacher turnover rates would help in determining the extent to which higher alternative wages are attracting present or potential teachers away from the field; (2) decisions regarding new or altered curriculum requirements need data regarding the feasibility and cost of staffing the programs with qualified teachers; (3) state-wide policy decisions need to be made with an awareness of the special teacher supply problems of rural areas or other critical-need school locations; data need to be available to help policy makers select effective ways of alleviating those supply problems; (4) to make decisions regarding career incentive and merit pay programs, policy makers need data regarding the responsiveness of teacher supply to wages, various working conditions, job security expectations, and other elements that influence job satisfaction and occupational choices.

Development of Project

Because of the importance of basic supply and demand data to competent labor market analysis and effective policy making, the Council's teacher labor market research project began with an assessment of the availability and credibility of information from state education agencies in the region. It was determined that better information regarding teacher turnover (resignation, retirement, death, and dismissal) and teacher labor market participation rates (supply) would improve the data basis of state-level policy analysis. Components of the market conditions research project were designed to fill that need. A sample-based survey was conducted to estimate actual district-level turnover rates. To provide better understanding of teacher supply, an econometric model of teacher labor market participation was developed. That model relates the probability of an individual's entering (or reentering) the teacher labor market to wages in teaching and to other conditions that might be subject to policy influence. These research components are described and discussed under the subheadings of this section.

Evaluation of State Teacher Supply and Demand Information

The twelve member states' education agencies were contacted to determine what teacher supply and demand data were collected by them and what analysis was conducted--either ad hoc or regularly. The research staff also collected and examined other information and analyses of teacher labor market conditions at the regional and national level. Particular attention was given to the reports of the National Center for Education Statistics and the National Education Association. The current state, regional, and national data sources were examined and evaluated. Evaluation criteria were necessarily subjective and focused on issues of accuracy, timeliness, and relevance to perceived policy needs. The subjective impressions and opinions of policy analysts within state education agencies were sought and included in the evaluation process. The results of this effort are reported in detail in the Council publication, "Report and Evaluation of Current Information Regarding Teacher Supply and Demand" (Bird, 1984).

The state education agencies of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia were surveyed: (1) to determine individual state efforts to collect and analyze teacher supply and demand data; and (2) to compile reports of the results of any such recent efforts. The survey found that eight of the states reported that they do currently or have recently produced reports dealing with some aspect of the teacher supply and demand situation. Those states were Alabama, Florida, Kentucky, Louisiana, Mississippi, North Carolina, Tennessee, and Virginia. In addition, Arkansas, South Carolina, and West Virginia reported that they collect some teacher supply and demand data that may support future studies. Georgia reported that it was evaluating data needs in the context of teacher supply and demand information. For Kentucky and Tennessee, the available reports were of data compiled by the higher education planning divisions of the states. The detailed findings of the data furnished by each state are contained in the previously cited Council publication. In summary, the states reported consistent patterns of emerging teacher shortages in the areas of special education, mathematics, and natural sciences. The information reported by the states was consistent with the national trends analyzed in the NCES report.

National data and that reported by the individual states in the Southeast point to a teacher labor market that is in a state of flux. Following the peak in public school enrollments in the early 1970s, the demand for new teachers began to grow more slowly than previous trends, and it eventually began to decline. An apparent surplus of applicants for teaching positions emerged and was followed by a general decline in the number of college graduates prepared to teach. Despite the decline in teacher preparation program graduates that began nationally in 1972 and in every southeastern state by 1975, the focus of analytical concern regarding the teacher market remained focused upon an apparent surplus of applicants through 1980. Only since 1980 has there begun to develop a general recognition that significant shortages of teachers exist in specific areas of specialization.

The review of the national and state teacher supply and demand data revealed that noncomparability of data from different sources and different states is a major problem. Not only do different states use different measures of supply, but in some instances the concepts of supply and demand used within a given report are not consistent. For example, in some state reports, supply is defined in terms of recent graduates of teacher preparation programs, although demand is defined in terms of total number of teachers actually hired. These definitions are not comparable to one another, and neither is an accurate measure of what it purports to represent. Supply of teachers properly consists of the total number of persons qualified and willing to accept teaching positions at current market wage rates. Since a sizeable number of education degree graduates do not even apply for teaching jobs, it is clear that the number of graduates is an overestimate of the supply of beginning teachers. Also, beginning teachers are only a part of the total supply of teachers. Supply should also include applicants from the groups of former teachers and previous graduates who have never taught. Only in the most recent years have the national analyses attempted to deal with these elements of teacher supply, and most state-level analyses continue to deal only with recent graduates.

The state analyses of teacher supply and demand did not consider the role of the reserve pool of potential teachers in the teacher supply situation. Yet that group is an important current and continuing source of teachers. A survey conducted by the Southeastern Regional Council indicated that approximately two-thirds of the resigning teachers each year enter that reserve pool (the remaining one-third accept teaching positions in another district). Based on the same survey, the overall teacher turnover rate (resignations, retirements, dismissals, and deaths) is 8.03 percent in the Southeast, and 66 percent of that turnover is by resignation prior to retirement age. School personnel planners need to examine and understand the flow of persons into and out of the reserve pool of former teachers in addition to the flow of new teacher graduates in order to accurately assess and forecast labor market conditions.

On the demand side, data regarding the total number of teachers hired do not accurately measure demand for teachers by public schools. Demand means the total number of qualified teachers that public schools would be willing to hire at existing wage rates. Actual employment data need to be supplemented by data on unfilled vacancies to better measure demand. This is done in only some of the state analyses. Also, useful data for demand analyses should include information on out-of-field teachers for the total teacher stock (not just newly hired teachers).

The data available throughout the late 1970s implied that college students were aware of the declining employment opportunities in the teaching fields (Zarkin, 1982). The simultaneous decline in the absolute and proportionate numbers of college students who chose to pursue teacher education programs is evidence that they responded rationally to their awareness of declining public school enrollments and diminished public school employment opportunities. Since data regarding both declining demand and declining supply of new teachers were available throughout the period, it is surprising that neither the national nor the state reports that were examined questioned whether the decline in new teacher supply might exceed the decline in demand.

It also seems surprising that none of these reports recognized the possibility of general teacher shortages in some local communities or state regions, despite the existence of a general surplus of teachers nationwide. Such local shortages might exist because of the difficulty of attracting new personnel to some rural or central-city areas. Another cause of localized shortages is the rapid growth of school enrollment in localities that experience above-average economic growth and related population influx. None of the state-level analyses of teacher labor market conditions addressed such problems that might exist within the state.

Although the existence of shortages in specialty areas has only recently been recognized, much of the available data indicate that such shortages may have already been present in the mid-seventies when general supply surpluses were the focus of discussion. At the least, the emergence of shortages in key specialties could have been forecast from the mid-seventies on the basis of a well-thought-out analysis of the dynamics of labor markets.

The Market Adjustment Process

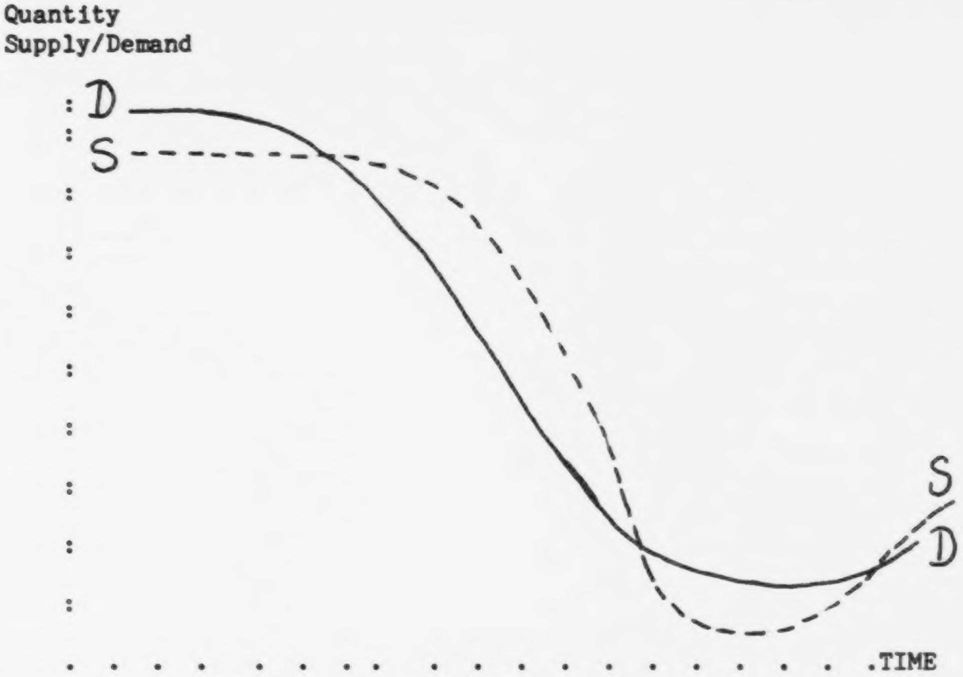
Available analyses of teacher labor market conditions by state education agencies ignore the elementary principles of the market adjustment process. Policy makers at the state and local levels have not been adequately informed of the interactions of market forces and behavioral reactions that explain the observed dynamics of teacher supply and demand. This deficiency in state-level analyses has resulted in inaccurate forecasts of market conditions and inappropriate policy advice.

The relative oversupply of teachers that was evident during the mid-seventies was accompanied by a relative decline in wages. The decline in wages of teachers (relative to other occupations) contributed to the decrease in numbers of persons preparing themselves to enter teacher preparation programs. As Weaver (1983) has pointed out, the decline in quantity as wages fell and as job opportunities were perceived to be scarce was accompanied by a decline in quality of the teacher work force as well. Academically outstanding graduates would presumably have the greatest options in the alternative occupations that offered growing employment and rising wages during the 1970s. The seeds of today's quantitative and qualitative shortage of teachers were planted in the previous period of surplus. Overreaction of the market to disequilibrium conditions may be leading to cyclical surplus-shortage patterns.

It is common in many markets for overadjustment to occur in response to an initial outside disturbance. Such an adjustment process is illustrated in Figure 2. In the case of the teacher market, the outside disturbance was the sudden drop in the birthrate, which was reflected in declining public school enrollments of the 1970s. This led to a decrease in the demand for new teachers at the same time that larger populations of college graduates were increasing the supply of new teachers. The result was the surplus of teachers that emerged in the mid-seventies. The surplus of teachers reduced the pressure on

Figure 2

Hypothetical Market Adjustment Process
Over Time



public policy makers to increase teacher wages as fast as wages were rising in other sectors of the economy. The relative wage position of teachers deteriorated. At the same time, school officials used the favorable market situation to lower student/teacher ratios and expand special education programs. This partially absorbed the bumper crop of new teachers in the early seventies. Only in the late seventies, in response to fiscal constraints, did staff reductions and teacher unemployment become widespread.

The Council-sponsored research into the nature of college students' expectations about income in various fields (described in detail in a subsequent section of this report) indicates that students may systematically overestimate opportunities in growing occupations while underestimating the opportunities in less favorable occupations. Such distortion of expectation is consistent with the observation of wide overswings in labor market conditions and would directly contribute to market instability tendencies. It could generate a phenomenon in the teacher labor market similar to the "hog cycle" familiar to agricultural economists. Such a cobweb-like adjustment process would generate the history of market conditions described by Weaver (1983).

The relative decline in teaching wages and the evident difficulty of new teachers in finding employment in the field led college students to reevaluate their career plans during the late seventies. Significantly fewer chose teacher preparation majors. This was shown in the decline in education graduates from 34 percent of total college graduates to 17 percent during the 1973-1981 period. Potential teacher candidates in different fields may have quite different alternative career opportunities available. Therefore, the reactionary decline in the supply of teacher candidates would affect some teaching specialties more than others. On the basis of that reasoning, one could have predicted the emergence of shortages in some fields of specialization while surpluses persisted in other fields.

It appears now that the reduced propensity of college students to major in teacher preparation programs, combined with some rebound in the school-age population (which most rapidly affects demand for elementary teachers), will lead to a shortage of teachers in elementary education specialties in the late 1980s and a shortage of secondary teachers in the 1990s unless changes in student expectations about relative teacher wages and job opportunities alter the current supply trend.

An important element of the institutional structure of the market that causes fluctuating supply-and-demand relationships is the time lag involved between decisions to enter teacher training programs and the discovery of actual employment opportunities. Another element involves the mechanism by which information about teacher wages and job opportunities flows to potential participants in the market. Education policy makers need to be concerned about whether persons on the supply side of the market form expectations in an accurate and efficient manner. The authors' survey of college students' starting salary expectations and comparison to actual reported starting salaries indicates that they do not form accurate expectations.

More investigation of this phenomenon and its implication for education policy is needed. Surprisingly little work has been done to analyze and interpret the institutional structure and behavioral characteristics of the teacher labor markets. Understanding of such characteristics needs to be included in the decison processes of education policy makers.

Data Inadequacies of State Reports

The existing efforts to forecast teacher supply and demand at the national, regional, or state levels have been hindered by insufficient data in the categories of turnover rates, rates of education program selection by college students, reentry rates for former teachers, data regarding interstate mobility of teachers, rates at which graduates in education apply for teaching jobs, rates at which applicants accept teaching job offers, and data relating to cause of separation when teachers leave the field. Attention to these data needs and to the problem of analyzing the causes of changes in the values of such items would greatly improve the ability to forecast teacher supply and demand trends.

The Southeast Teacher Supply Model

A key element of this research effort has been the estimation of a stocastic teacher labor supply function for the southeastern region (Douglas and Bird, 1985). Data from the

1983 Current Population Survey (CPS) was used to estimate an equation that relates a variety of demographic and education variables to the probability that an individual will choose to enter the teacher labor market. The dependent variable is a probability for an individual-entry decision. The total supply of teachers is not forecast directly. To generate a forecast of total teacher supply, it is necessary to multiply the appropriately derived probability by the relevant potential civilian labor force estimate for the region. The model was derived based on Southeast-specific data.

The CPS data set was merged with a smaller data set gathered from "Digest of Education Statistics 1983-84." These data items included enrollment, racial balance, student/teacher ratios, teacher pay, number of principals and assistant principals, and per pupil expenditure for each state school system in the sample for 1982 and several previous years.

The Estimation Process

There were three separate stages to the estimation process. First was estimation of the likelihood that an individual would enter the labor force at all. Next was estimation of a predicted annual salary for workers. This required correcting for the bias resulting from leaving nonworkers out of the wage regression. Finally the analysis focused on the variables relevant to the teach/not-teach decision. The final model has the ability to indicate the effectiveness of various types of policies on different groups of prospective teachers.

To estimate the likelihood of a person's entering the general labor market, the data set was analyzed using the SAS Logistical Regression technique. The variables were chosen to reflect the standard neoclassical labor supply model, wherein the income/leisure constraint becomes steeper as an individual's market wage increases by virtue of experience or education. This characteristic of labor supply functions is associated with positive relationships between education and experience and the preference to work. The constraint shifts upward in a parallel manner as unearned income increases. This makes labor-force participation less likely. Finally, anything that increases the need for or the value of leisure time (e.g., household and child-rearing duties) will raise the marginal rate of substitution of income for leisure, making labor-force participation less likely. The coefficients derived from the regression analysis fit the assumptions of that conventional labor market model.

The next step, estimation of earning opportunities for labor-force participants, was necessary to incorporate an opportunity-cost component into the teacher labor decision problem. The general labor-force participation probability was used to generate an unbiased estimate of both worker and nonworker labor market opportunity cost, given the various types of sociodemographic information provided in the data set. The procedure involved exclusion of nonparticipants from the regression data base. To prevent bias, the inverse Mills Ratio, estimated from the decision-to-work regression, was used as a correlation term in the earnings regression. A linear model was used to relate the variables chosen to the actual yearly earnings of the individuals in the dataset. These results are shown in Table 2. The variables used as predictors of yearly earnings in the labor market were chosen to reflect human capital considerations and family characteristics as well as the realities of the marketplace. The explanation of the variables used is on page 43.

One coefficient in the earnings prediction equation described in Table 2 requires clarification. The negative sign of the education coefficient may seem paradoxical. How can one explain the negative coefficient on years of school attended? The answer becomes clear if one considers that variable in conjunction with the variable EDSQR (years of education squared). The coefficient on EDSQR is positive and about one-seventh of the value of the coefficient on EDATTD. This means that a person who has seven or fewer years of education will be no better off than someone who has no education at all, but as years of education increase from seven, the payoff from education increases as years of education squared. Compared to the seventh-grade base, the equation predicts that a high school

Table 2

Regression Model Results
Predicted Earning Opportunities for Labor Market Participants

DEPENDENT VARIABLE: TOTEARN, OR TOTAL EARNED INCOME IN 1982

F VALUE	PROB>F
548.525	0.0001

ADJUSTED R-SQUARE 0.4614

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: ARAMETER=0	PROB > |T|
INTERCEP	1	-28407.994	2023.740	-14.037	0.0001
AGEYRS	1	506.647	33.258504	15.234	0.0001
AGESQR	1	-8.331493	0.808112	-10.310	0.0001
SEX	1	6218.374	374.520	16.604	0.0001
RACE	1	1788.559	221.135	8.088	0.0001
URBAN	1	1808.546	174.054	10.391	0.0001
UNION	1	2900.502	486.047	5.968	0.0001
SCIMATH	1	6309.003	651.002	9.691	0.0001
TOTINCOT	1	0.128024	0.036315	3.525	0.0004
WEEKWKD	1	212.372	5.908353	35.944	0.0001
HOURWKD	1	150.421	7.066629	21.286	0.0001
SELFEMP	1	-2825.563	281.780	-10.028	0.0001
MARRIED	1	1535.646	189.800	8.091	0.0001
SPOUSINC	1	-0.045119	0.006480636	-6.962	0.0001
MALEDC	1	665.639	339.440	1.961	0.0499
FEMDC	1	595.693	432.867	1.376	0.1688
EDATTD	1	-448.797	177.554	-2.528	0.0115
EDSQR	1	62.008634	7.354108	8.432	0.0001
CORRTERM	1	786.129	1205.244	0.652	0.5142

diploma will add $4,628 to an individual's average yearly income. A college degree is worth $5,640 per year more than the high school diploma, according to this equation. Therefore, the equation does show that education is valuable and that the value of education increases with higher levels of education.

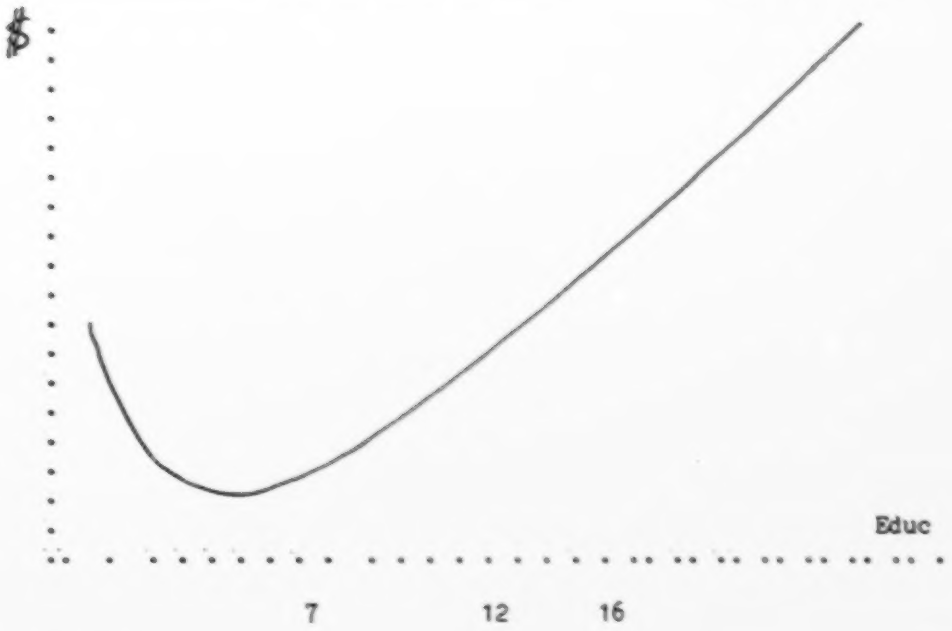
Explanation of Variables Used on Table 2

Variable	Explanation
AGESQR	AGEYRS squared
AGEYRS	Individual's age in years
AVGWGT	Teachers' average yearly salary
CLDUN18	Number of children in household under 18 years old
CORRTERM	Mills Ratio (see Appendix A)
DCNEED	Equals 1 if individual has a child under 5
EARNER2	Equals 1 if individual earns less than spouse
EDATTD	Number of years of education completed
EDSQR	EDATTD squared
FEMDC	Equals 1 if the individual is woman with a child under 5 years old
GRAD	Equals 1 if individual has 19 years or more of school
HOURWKD	Average number of hours worked per week in 1982
INTERCEP	Constant term of the regression
MALEDC	Equals 1 if individual is a male with a child under 5 years old
MARRIED	Equals 1 if individual is married
PREDWAGE	Ratio of principals plus assistant principals to teachers
RACE	Equals 1 if individual is white, 0 otherwise
SCIMATH	Equals 1 if individual is in a scientific, mathematical, or engineering profession
SELFEMP	Equals 1 if individual has income from self-employment
SEX	Equals 1 if individual is male, 0 if female
SPOUSINC	Spouse's earned income
TOTINCOT	Amount of nonwage income received by individual in 1982
UNION	Equals 1 if individual belongs to a union, 0 otherwise
URBAN	Equals 1 if individual lives in SMSA, 0 otherwise
WEEKWKD	Number of weeks worked in 1982

Theoretically, one might expect there to be eventual diminishing returns to increased education, but the data set does not contain enough observations beyond the Bachelor's and Master's level to detect that functional critical point. Figure 3 illustrates the shape of the estimated earnings-versus-education relationship.

Figure 3

Estimated Earnings-Versus-Education Relationship



Findings of the Supply Function Estimation

Table 3 presents the results of the estimation of probability that an individual will enter teaching. The actual model estimated is a cumulative probability density function described by the equation shown as Figure 4. The data subset used was composed of all college graduates in the CPS for the 12

Table 3

Results of Supply Function Estimation Procedure

```
                        LOGISTIC REGRESSION PROCEDURE
         DEPENDENT VARIABLE: TEACH, WHICH EQUALS 1 IF PERSON TEACHES K-12

                              2741 OBSERVATIONS
                              2344 TEACH    = 0
                              397  TEACH    = 1

CONVERGENCE OBTAINED IN 7 ITERATIONS.                        R =   0.471.
MAX ABSOLUTE DERIVATIVE = 0.1595D-07.                -2 LOG L = 1735.56.
MODEL CHI-SQUARE = 532.07 WITH 14 D.F.          (-2 LOG L.R.) P =     0.0 .

VARIABLE             BETA          STD. ERROR        CHI-SQUARE          P

INTERCEP       -6.27773471        1.91929001            10.70        0.0011
PREDWAGE        0.00007827        0.00001215            41.49        0.0000
SEX            -2.41526687        0.18675240           167.26          .
SPOUSINC       -0.00001004        0.00000461             4.74        0.0295
EARNER2         1.00296095        0.17763755            31.88        0.0000
DCNEED         -0.38899100        0.19819260             3.85        0.0497
RACE           -1.09100949        0.16955755            41.40        0.0000
URBAN          -0.97903872        0.13426144            53.17        0.0000
GRAD            0.34814236        0.13784040             6.38        0.0115
AGEYRS          0.04586176        0.02814822             2.65        0.1033
AGESQR         -0.00108624        0.00058312             3.47        0.0625
SELFEMP        -1.21785377        0.33991949            12.84        0.0003
PRINCIP       -22.96146314       11.72421131             3.84        0.0502
AVGWGT          0.00018240        0.00006749             7.30        0.0069


FRACTION OF CONCORDANT PAIRS OF PROBABILITIES AND RESPONSES:          0.823
RANK CORRELATION BETWEEN PROBABILITY AND RESPONSE          :          0.661
```

southeastern states. Overall goodness-of-fit measures show that the explanatory value of the regression is excellent, and the signs of the parameters shed much light upon the questions raised by the model. In general, an individual's personal characteristics are stronger determinants of the desire to teach

Figure 4

The Teacher Supply Model
Cumulative Probability Density Function

$$P(t) = 1 \left(1 + e^{-\left[a + \left[_{i=1}^{n} B_i X_i\right]\right]}\right)$$

Where a and B's refer to "Beta" estimates in Table 3

than are the characteristics of the school systems that might hire them. Of the personal variables, the most important determinants of predicted probability of teaching were the respondent's sex, race, predicted market wage, urban-versus-nonurban residence, earning status within the family, and possession of a postgraduate degree. Of the school system variables, the average salary paid teachers in the respondent's state and the amount of supervision teachers receive (ratio of principal and assistant principals to teachers) were both found to be statistically significant determinants of the decision to teach.

The results show that by far the most important determinant of a decision to teach is the person's sex. The SEX variable was set as one for male respondents and zero for females, so the negative coefficient indicates that women are more likely to be teachers. This supports the findings of casual observation. The effect of being female is amplified further by the fact of being the second, or lower, wage earner of the family (EARNER2), as many women are. For those whose spouses have a very high income, teaching becomes less attractive. This is indicated by the negative coefficient on the amount of spouse's income (SPOUSINC). Both male and female respondents with small children were less likely to be teachers, as indicated by the negative and significant coefficients on the DCNEED variable. When combined with the results from the labor-force participation regression, this result indicates that in the majority of cases men with small children were likely to seek more lucrative employment than teaching while women tended to leave work altogether to stay home and care for the child.

That men and women who do teach are in fact likely to be able to find more lucrative job opportunities elsewhere if they wish is indicated in this regression by the positive coefficient on the respondents' predicted wage variable (PREDWAGE). The variable PREDWAGE was constructed by multiplying the coefficients derived in the earning opportunity OLS regression by the values of the corresponding variables for each individual and adding these to get an unbiased estimate of what an individual with such attributes should be able to earn in the market place. Its positive coefficient in the teacher market participation probability regression indicates that people who should be able to command high salaries (by virtue of years of education and experience) are more likely to be teachers than otherwise similar individuals with lower alternative earning opportunities. This result may seem paradoxical, but is probably explained by the tendency of additional education (which generally raises earning opportunity) earned by teachers to be added piecemeal after the initial career entry point and for that education to be concentrated in coursework that is specific to the teaching occupation and not readily transferable to other endeavors. It is important to note that the regression equation that relates earnings to education considers only years of education and does not reflect any distinctions among courses of study.

Other personal characteristics variables in the equation have the expected signs and significant coefficients. These include age and age squared, which indicate that the likelihood of teaching increases for a time, then decreases as people age. The coefficient of race indicates that nonwhite college graduates are more likely to teach than whites. Persons with graduate degrees are more likely to be teachers. One must be careful to avoid spurious causation interpretations of such regression results. Obtaining a graduate degree does not cause one to become a teacher. Being a teacher, or being predisposed to become one, may influence the pursuit of graduate degrees. Urban college graduates, with their more varied opportunities, are less likely to find teaching an attractive career. Finally, people with self-employment income are considerably less likely to enter the teacher labor market.

Policy Implications of Supply Model

The coefficients of the school system variables in the equation are important for education officials, because they describe the nature and impact of possible policy alternatives for altering market conditions. The results indicate that the average salary offered to teachers is the single most important policy determinant of probability to enter the teacher market. This is not to deny that there are other important factors, but those other factors, including personal preferences of workers (which have been described in Berry, 1984), are not directly amenable to manipulation by public policy makers. Here, the focus is on variables that states can control. Only one other policy varible, the principal/teacher ratio, was found to be a statistically significant determinant. The regression reported in Table 3 has been stripped of the policy variables found to be insignificant in previous trials so that it could be used for the derivation of policy elasticities found in Tables 4 and 5. Variables tried and rejected include rates of change in enrollment and teacher salary, per pupil expenditure, minority enrollment concentration, and student/teacher ratios.

Table 4

Elasticity of Predisposition To
Teach With Respect to Average Wage
and Principal/Teacher Ratio

POLICY	ALL	MEN	WOMEN	WHITES	NON-WHITES	GRAD SCHOOL
AVERAGE TEACHER EARNINGS	2.663	2.79	2.324	2.69	2.315	2.541
PRINCIPAL/ TEACHER RATIO	-1.12	-1.17	-1.00	-1.13	-.992	-1.08

POLICY	FIRST EARNER	SECOND EARNER	URBAN	RURAL	SELF-EMPLOYED	NON-SELF-EMPLOYED
AVERAGE TEACHER EARNINGS	2.719	2.498	2.735	2.534	2.822	2.633
PRINCIPAL/ TEACHER RATIO	-1.14	-1.07	-1.15	-1.08	-1.18	-1.11

The principal/teacher ratio was found to be statistically significant. This variable was intended as a proxy for the degree of supervision and bureaucratic control that teachers face. The negative value of the coefficient indicates that the more bureaucracy teachers face, the less attractive teaching is to potential market entrants. This finding supports Berry's conclusion that "the bureaucracy of today's schools has influenced the low morale present among public school teachers" (Berry, 1984, p. 78). The problem seems to be that teachers feel that they are not being treated as responsible

Table 5

Elasticities of Predisposition To Teach
With Respect to Teacher Wage and Principal/Teacher Ratio
for Various Income and Age Groups

	FOR VARIOUS INCOME GROUPS					
	$15K	$20K	$25K	$30K	$35K	$40K
AVERAGE TEACHER EARNINGS	2.601	2.68	2.59	2.466	2.759	2.688
PRINCIPAL/ TEACHER RATIO	-1.1	-1.13	-1.1	-1.06	-1.16	-1.13

	FOR VARIOUS AGE GROUPS				
	21 YRS.	25 YRS.	30 YRS.	35 YRS.	40 YRS.
AVERAGE TEACHER EARNINGS	2.747	2.695	2.625	2.596	2.572
PRINCIPAL/ TEACHER RATIO	-1.15	-1.13	-1.11	-1.1	-1.09

professionals by the administration. As one teacher in Berry's study said, "I don't like people checking up on me" (Berry, 1984, p. 61).

Based on these results, it appears that policy makers can attract and retain teachers more effectively if they raise teachers' salaries and lower their bureaucratic burden. Much recent attention has focused on the need to assess teachers, eliminate ineffective teachers, and reward effective ones. These results indicate that more emphasis should be placed on evaluating the effectiveness of principals. Creation of an organizational structure conducive to high morale will contribute to increased probability of attracting competent people into teaching.

Simulation of Attrition Reduction Policies

Table 6 uses the results of the model to address the issue of finding appropriate policies to counteract teacher attrition. Many normal lifetime events can lessen the attractiveness of a teaching career. This is complicated by the fact that teachers are primarily women and often the second wage earners. They move with their spouses and have children, and changes in spouse income may alter their need for supplementary income. All of these events can result in a teacher's leaving the occupation either to stay at home or to get a higher-paying job. Since experience is a valuable asset in a teacher, policy makers may wish to discourage this tendency to leave teaching. What policies are most effective toward this end? The data in table 6 may help answer some of these questions.

Table 6

Effects of Policy Changes on Teacher Attrition

		20% MORE PAY		LESS SUPERVISION		BOTH CHANGES	
	STATUS QUO PCT DROP	PERCENT DROP	EFFECT INDEX	PERCENT DROP	EFFECT INDEX	PERCENT DROP	EFFECT INDEX
EVENTS							
Having a Child	-11.5	-9.32	0.186	-10.7	.0687	-8.38	.2684
Moving to SMSA	-50.7	-43.5	.1413	-48.1	.0504	-40.1	.2089
Spouse Income Rises 50%	-6.58	-5.32	.1921	-6.11	.0713	-4.76	.2763

On the left side of Table 6 are the three events whose effects were studied: having a child, moving from a rural area to an SMSA, and experiencing a large increase in spouse income. All three events reduce the likelihood that a person will be a teacher. The first column shows the percentage drop in likelihood to teach that will result from each event based on existing policies. The second, fourth, and sixth columns show the comparable figure for each of three different policy regimes: 20 percent higher average teacher salary, 20 percent drop in principal/teacher ratio, and both. The third, fifth, and seventh columns show the proportional drop in the attrition rate attributable to the three policy regimes in this simulation. This figure is called the effect index. The effect index is larger for policies that are more effective in preventing teacher attrition.

The effect index indicates that an across-the-board increase in teacher pay would be an effective policy to discourage attrition. It is most effective to counteract the tendency of teachers to leave after the spouse has received a pay increase. It is less effective in discouraging attrition from the occupation after relocation from a rural to an urban residence.

Forecasts of Market Condition

The model of teacher labor supply can also be used to forecast the total supply of teachers that can be expected from a specified population. As a forecasting tool, the model can be used to estimate supply of teachers or teacher-training candidates for the region, for a state or locality within the region, or for a program area within a university system. In conjunction with this research, the authors have developed a microcomputer program that allows the user to manipulate conditions and policies affecting the market and simulate the results in terms of a forecast teacher supply. The program is a straightforward application of the cumulative probability density function that was described above.

If characteristics of the college-educated population of the Southeast are entered into the model along with the 1983 regional average teacher pay level ($17,463) and the principal/teacher ratio (.0547), the predicted probability that a college-educated resident of the region would seek employment as a public school teacher was estimated to be .0218932. If this probability is applied to the estimated number of persons in the college-educated pool of potential workers in the Southeast (5,823,074), the expected value of the total supply of teachers is 127,485. Table 7 shows a sample printout of the policy simulation program that illustrates this estimate. This estimate should be interpreted as the expected value of the number of persons who would choose to enter teaching if all members of the specified population group were given the opportunity simultaneously to revise their career decisions without any transactions costs. That simultaneous revision of choices, of course, would not happen since transactions costs are present and significant. Having chosen a career, many persons remain in it even though they may come to regret the choice. Since the forecast number who would freely choose teaching is less than the current number (507,045) of persons actually working as teachers, the difference indicates the

Table 7

Example of Market Condition Simulation

```
Preliminary Policy Analysis Model for the Teacher Labor Market

  Teacher Labor Market Individual Supply Probability Model

     Specify values for the following individual characteristics:

     Alternative Earning Opportunity (in dollars per year)    19,755.39
     Sex (1=male; 0=female)                                       .55673
     Income of Spouse (in dollars per year; 0 if unmarried)  15,629.64
     Earner Status (0 if primary earner; 1 if second)             .31047
     Child Care Need (0=no; 1=yes)                                .10872
     Race (0=nonwhite; 1=white)                                   .89493
     Urban Residence (0=no; 1=yes)                                .55491
     Masters Degree Completed (0=no; 1=yes)                       .40825
     Age (in years)                                             38.8572
     History of Self Employment (0=no; 1=yes)                     .10434

     Specify values for the following school characteristics:

     Average Pay of Teachers                                      17,463
     Ratio of Principals (including Assistants) to Teachers        .0547

The probability that an individual member of a group having the
about mean characteristics will enter teaching is              .0218932

To estimate total teacher supply, enter the estimated number of
persons in the group having the specified mean characteristics: 5,823,074.

       Note:  The estimated college-educated/work-eligible
              population of the Southeast is 5,823,074

The expected value of the total supply of teachers:             127,485.8

       Note:  In the Southeast, 507,045 persons were employed
              as public school teachers in 1982-83
```

number of teachers who regret their past decision to become teachers, even though transactions costs prevent them from revising their decision now. The estimate means that three out of four teachers regret having entered the field and may be discouraging their current students from considering teaching careers.

Since the estimate here is a stock estimate for the labor supply, it indicates the direction and eventual cumulative total of labor-supply flows over time without indicating the rate of flow. It means that if market conditions are not altered, an extremely serious shortage of teachers will emerge over time as attrition removes present teachers.

The model reveals that teacher supply may be quite sensitive to changes in teacher salary level. If the amount entered in the model is raised to $25,420, it was found that the expected value of the total supply rose to 507,877. At that level, the current demand for teachers in the region would be met. The market could be considered to be in an equilibrium. Raising the average salary beyond that level would produce a surplus of persons seeking jobs as teachers. The result of this simulation is shown in Table 8.

Those who set educational policy need all of the information they can get on the effectiveness of various policy changes for retaining and attracting specified types of candidates to the teaching profession. They need a way of predicting how various types of people will react to changes in policy. This study represents a step in the direction of making such predictions possible. The results are encouraging; the

Table 8

Example of Simulation with Higher Salary

```
Preliminary  Policy Analysis Model for the Teacher Labor Market

   Teacher Labor Market Individual Supply Probability Model

Specify values for the following individual characteristics:

   Alternative Earning Opportunity (in dollars per year)  19,755.39
   Sex (1=male; 0=female)                                    .55673
   Income of spouse (in dollars per year; 0 if unmarried)  15629.64
   Earner status (0 if primary earner, 1 if second)          .31047
   Child care need (0=no; 1=yes)                             .10872
   Race (0=non-white; 1=white)                               .89493
   Urban residence (0=no; 1=yes)                             .55491
   Masters degree completed (0=no; 1=yes)                    .40825
   Age (in years)                                           38.6572
   History of self-employment (0=no; 1=yes)                  .10434

Specify values for the following school characteristics:

   Average pay of teachers                                    25420
   Ratio of principals (including assistants) to teachers     .0547

   The probability that an individual member of a group having
   the above mean characteristics will enter teaching is:  .0872181

   To estimate total teacher supply enter the estimated
   number of persons in the group having the specifified
   mean characteristics:                                   5823074.

       Note:  the estimated college-educated/work-eligible
               population of the Southeast is 5,823,074

   The expected value of the total supply of teachers is  507,877.4

       Note:  In the Southeast, 507,045 persons were employed
              as public school teachers in 1982-83
```

variables chosen can be said with some confidence to affect teachers' career decisions. However, it must be emphasized that this is only a preliminary attempt at developing such a model.

Significant problems of concept, specification, and data identification need to be studied to improve this model.

As better data become available, the accuracy and flexibility of the predictions should increase. More attributes of the schools might be found to have an effect on the decision to teach if the data available were better at describing the schools as work places. More specific data on local systems, starting with at least a differentiation between urban and rural systems' characteristics within a state, would be very useful. Similarly, more specific data on individuals' characteristics would be useful. For example, what type of training does an individual have? What subject does a specific teacher teach? What type of schools did he/she attend? These are the kinds of questions that the CPS data set does not presently include, but that it or a similar data set could include to be even more useful for this sort of study. Additionally, it would be useful to include longitudinal information on the same person over a period of several years.

There is no reason why this estimation technique needs to be limited to the teacher labor market. It can be employed to describe the determinants of any career choice, for example, to examine the market for engineers or the decision process of college students for different types of careers. All that is needed is a suitable data set. Comparisons of teaching supply to supply decisions for other occupations would be useful to education policy makers and would explain the interaction between teaching and other occupations.

Conclusions Regarding Estimation of Labor Market Conditions

Current state-level attempts to collect data and monitor teacher labor market conditions do not provide sufficient information. It seems that more complete, relevant, and timely data on teacher supply and demand trends are needed. The teacher supply model developed as part of this overall research initiative offers a potential demonstrated way of improving the analytical base of teacher labor market policies. The supply model showed that attitudes about teaching and perceptions of teaching work conditions may be important variables affecting the supply of teachers along with the obvious problem of low teacher salaries. Teachers' attitudes about their jobs affect not only their own supply decisions, but also impact on the career decisions of their students. The variables studied indicate that this may be improved by policy makers if salaries are raised and bureaucratic burdens associated with the job are lessened. Raising salaries may be the more effective method, but also the more expensive. Giving teachers more autonomy is somewhat less effective, but it is also probably going to be less expensive. Both policies are effective for all races, ages, sexes, and levels of alternative opportunity, but they are most effective in attracting and retaining young, white, urban men.

SECTION FOUR: CAREER CHOICE AND TEACHER RECRUITING

Description of the Research Context

What are the causes of the decline in the percentage of college students entering preparation for teaching? What is the relative importance of various influences such as expected earnings, family and peer pressures, curriculum content and perceived difficulty, school and college counseling services, and expectations regarding job availability? What practices are school systems and college teacher preparation programs following to recruit persons into the teaching occupations, and how effective are these attempts? What can public school officials do to improve the attractiveness of teaching for potential labor market entrants? These are the questions that directed the part of the labor market research project concerned with career choice and recruiting.

Three studies were conducted to gather information and test hypotheses in this topic area. The first was a comprehensive qualitative case study of the teacher labor market based on extensive individual interviews with key categories of market participants. The second was a survey of a sample of college students to investigate the nature of their expectations about earnings in various occupations. The third, a qualitative study based on interviews with persons who do not plan to enter the teacher market, was designed to discover why individuals are discouraged from becoming teachers.

The two qualitative studies were conducted by Berry and have been reported in the papers referenced earlier. The study of earnings expectations of college students was conducted by Bird and is fully reported in this paper.

Qualitative Study of Career Choice, Attitudes, and Recruiting

One hundred and eighty persons were interviewed. Those key informants consisted of deans, department chairs, student-teaching coodinators, placement officers, and students in the education units in universities; and superintendents, assistant superintendents, personnel directors, principals, assistant principals, and teachers in school systems. Twelve sites in two states were selected to ensure the geographical, economic, and cultural diversity representative of the Southeast. Six school systems and six universities in a range of urban to rural settings were used as research sites. At each site, interviews were conducted with informants fitting the categories described above. The interviews were conducted in an open-ended framework to elicit the multiperspectival experiences in the diverse settings. Interview guides were used to provide some uniformity of content to the interviews, but were not taken as rigid constraints on the process.

Interview responses, document analysis, and on-site observations from the school system interviews were categorized and analyzed according to: (1) background and contextual variables; (2) position availability, need, and turnover; (3) the identification and selection of teachers; and (4) employment conditions and teacher alternatives. Similarly, data from the university interviews were categorized and analyzed according to: (1) background and contextual variables, (2) student paths to education and teaching, (3) student perceptions of employment conditions, and (4) placement and recruiting procedures at the university.

Paths to Teaching

Generally, both university teacher training program students and currently employed teachers in the sample reported lower-middle- and middle-class family backgrounds. Both university students and currently employed teachers become interested in teaching because of previous positive experiences in their own schooling, role models, and personal desire to work with children (Berry, 1984). The latter reason was most often reported by elementary teachers. Secondary teachers reported a strong identification with their subject area. University students similarly reported the importance of former teachers as role models affecting their desire to become teachers. A common theme was a decision to choose teaching made at a relatively young age (prior to high school graduation). This pattern tends to be consistent across all of the interview sites and emphasizes the significance of teachers as role models for recruiting future teachers.

The students in the teacher training programs perceived teaching as an exciting and challenging occupation. For some, it represents a chance to fulfill their childhood ambitions. Many of the education majors have not seriously considered or investigated alternative occupations. This is especially true of the students from rural backgrounds. Many saw teaching as a way of avoiding the competitiveness and productivity pressures that they associated with nonteaching occupations. Students reported that teaching suited their personalities, life styles, and personal values. Some students also emphasized the desire to avoid the more strenuous course requirements.

Students have definite impressions of expected working conditions in the schools. They are aware of discipline problems and extracurricular demands on teachers' time. They feel that school systems are looking for classroom managers, disciplinarians, and coaches. They anticipate receiving little support from parents and administrators. Given these perceptions, it seems surprising that these students still desire to be teachers.

The universities surveyed appeared to do little to recruit students to their teacher training programs. Those who did try to recruit reported little success, because students had already made up their minds. No institution attempted to recruit selectively based on academic performance. Typically, education program recruiting efforts were targeted only toward students who had already indicated some interest in teaching on a prior screening by high school or (general) university counselors.

Recruiting

After a student has completed a teacher training program, there is typically little help or support from the university to find a teaching position. Education program officials stressed the importance of students' developing their own informal networks and using student-teaching internships as a route to a full-time job. Repeatedly, students looking for jobs, university officials, and employed teachers stressed the importance of the informal network in the teacher recruiting and hiring process. They stressed the importance of knowing someone in the local school system as the essential route to finding out about job availability and to being seriously considered for hiring. As one education program administrator at a university in a rural part of the state said, "In this part of the state, knowing the superintendent is the most important and noted avenue for employment as a teacher." (Berry, 1984, pp. 48-49).

At the local school system level, almost no emphasis was given to teacher recruiting. School system administrators tend to assume that the right person will walk in the door. Searching and cultivating the marketplace are virtually unknown activities. Generally, whoever walks in the door turns out to be "right." If local schools do any recruiting, it involves an administrator's traveling to a few select universities to increase the reservoir of applicants. Only the largest urban districts show any sophistication in the recruiting process.

Recruiting by school systems on university campuses is rather limited since administrators tend to call only on the department chairs that they know. Placement officials at universities report that the recruiting process in public education is hindered because the school system representatives sent to campuses are not effective or well-informed individuals. In comparison to private industry representatives, they present a poor image for education in the opinion of the placement officials interviewed at several universities.

In summary, very little recruiting is done by either university education or school system officials in the process of identifying and selecting public school teachers. Although some university officials facilitate the enhanced marketability of the education students, most school system officials either rely on built-in supplies or informal networks. The supplies of urban systems are enhanced by local industries that have managers (with teacher-certified spouses) moving into the area. Many school systems identify and select new teachers primarily through their pool of substitute teachers and aides. School system officials are not necessarily interested in prospective teachers with high academic ability. They state that the characteristics preferred are an ability to relate to children and parents, to organize, to discipline, and to be willing to undertake extracurricular activities.

Earnings Expectations Study

A recurring theme in recent education policy discussions has been the assertion that adacemically able potential teachers are declining to enter teacher preparation programs because the salary opportunities are so much better than in other fields. The available evidence (Bird, 1984; 1985) does indicate that teacher salaries are significantly lower than those in other occupations that may compete with teaching careers for college-educated workers. That many potentially able teachers may choose other occupations to seek higher earning opportunities is consistent with both common sense and economic theory. But beyond this unsurprising observation lies another issue that has heretofore received no research attention: How accurate are the expectations about alternative earning opportunities upon which individual decisions not to enter teaching are based?

The question of accuracy of earnings expectations is important because occupational choices are more complex than a simplistic search for the greatest dollar-earning opportunity. Despite the fact that teacher salaries are less than earning opportunities in other occupations, some capable individuals would normally be expected to enter teaching with full knowledge of the earning deficiency. Economists would judge that such persons valued the nonpecuniary benefits of the teaching

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occupation to exceed the sacrifice of monetary income. In the case of such choices, individual knowledge of the actual difference in earnings between teaching and other occupations is important--it is not enough simply to know that there is a difference. Individual choice depends critically upon how much the difference is. If individuals think that the difference in earning opportunities is greater than it actually is, then some (who have chosen teaching if presented with correct information) would be led to reject a teaching career. Therefore, distorted expectations about earnings differences between teaching and other occupations could lead to an unnecessary contraction of teacher supply.

The preceding discussion explained the theoretical possibility of systematically distorted earnings expectations and the effect on the teacher labor market that such distortions would produce. The purpose of the expectations survey component of the teacher labor market research project was to test empirically for the presence of such distorted expectations. The question is important because distorted expectations would amplify the already-present forces tending to reduce the quality and quantity of the teacher work force.

For purposes of this study, the population of freshmen and sohpomore college students in the Southeast was identified as the theoretically relevant group of occupational decision makers. These students track themselves into somewhat fixed occupational paths by their choices of academic major programs. Their choices are assumed to be partially motivated by comparisons of expected earnings in the various occupations that stand at the ends of different educational paths.

The basic research design was to select a sample of the college freshmen/sophomore population and compare their expectations about earnings in various occupations to actual (true) data regarding earnings in each occupation. Earnings expectations for an occupation were defined as distorted if the mean earnings expectation of the student sample for that occupation was either above or below the actual earnings figure. To further define the meanings of the earnings expectations concept, two specific earnings expectations were targeted. The first was the average beginning salary for college-educated workers entering the occupation. The second was the average earnings level for all college educated workers in the occupation regardless of experience. Students in the sample were asked to report expected earnings in each of the two categories (beginning and overall) for each of several specific occupations.

In the first stage of the research, the research design was field-tested with a sample of students at three different colleges. The field test employed a written survey on which each student was asked to list beginning and overall earnings expectations for each of twelve specific occupations. The occupational categories were: Accounting, Marketing, Chemical Engineer, Computer Programming, Nursing, Business Management, Statistician, Public School Teacher, Electrical Engineer, Medical Technician, Banking/Finance Administration, and Government Administration. Ninety-seven forms were returned.

When the preliminary surveys were compiled, it was found that several of the categories had been too narrowly defined. This was evidenced by the incidence of nonresponse to specific items, by the extremely wide variation of responses, and by specific written comments of respondents on the survey forms (comments about form design were requested of the respondents). It was also determined that the response rate would be higher if the list of occupations surveyed were shortened. These factors influenced the design of the second version of the survey form. That design was also influenced by new considerations regarding the categories of occupations for which actual salary data would be available.

In the second stage of the research, the revised form was presented to groups of students at colleges across the Southeast. Only data from this second stage are reported here. Two hundred and seventy-seven freshmen and sophomores at five universities in the Southeast completed a one-page survey form during a regular class meeting. The survey included inquiries for sociodemographic data, student major and prospective occupation, respondent's own expected beginning salary, ten-years-later earnings expectation, and the respondent's expectation of the average beginning salary for eight occupational categories: Accounting, Marketing/Sales, Engineering, Computer Programming, Business Management, Statistician, Public School Teacher, and Health Professional (Other than Physician).

The average age of the respondents was 19.6 years. The typical respondent had completed .8 years of college. The distribution of majors was Business (21 percent), Humanities (13 percent), Natural Sciences and Math (16 percent), Education (11 percent), Social Sciences (14 percent), and other (7 percent). A total of 38 percent planned postgraduate study. Of those who planned to begin work upon receiving the B.A. degree, the average respondent expected to earn $25,300 in first year of work. That group expected to earn $37,600 per year after ten years. The group planning graduate study expected an average starting salary of $30,200 upon completion of terminal degree and $48,600 ten years later.

The students were also asked to estimate the average starting salary for all college graduates. The instructions listed 1983-84 academic year graduates as the reference point. The students' expectations were compared to actual starting salary data reported in the July 1984 Salary Survey Report of the College Placement Council (except teacher salaries, obtained from state agency sources).

It should be noted that the College Placement Council

Survey is not representative of all college graduates. The coverage of that survey is such that the larger and more prestigious universities are more prominently represented. Since graduates of those universities earn higher beginning salaries than other graduates, the starting salaries reported by the College Placement Council will be biased upward. The actual average starting salaries of all college students will be lower than the amounts used here as a basis for comparison. Thus, this study produces a very conservative estimate of the degree to which college students' earnings expectations are distortions of reality.

Table 9 shows the average beginning salary expectations for each occupation reported by students in the sample. The Table also shows for comparison the actual starting salary amounts from the CPC report. The figures in parentheses under the expectation averages are the standard deviation amounts for those expectation averages. The number of observations is 277 for each item, since incomplete forms were not compiled.

Table 10 summarizes the discrepencies between expected and actual salaries. Both Table 9 and Table 10 show clear patterns of distorted expectations. The occupations generally perceived to be fast growing (Engineering, Computer Programming, Accounting) are also associated with the largest excesses of expected salary over actual. In each of those cases t statistic tests revealed greater than 95 percent probability that mean

Table 9

Mean Student Estimates of Beginning Salaries and Comparison to CPC Reported Actual Beginning Salaries

Occupation	Expectation Average	Standard Deviation	CPC Report Actual
Accounting	23,200	(1950)	19,512
Marketing	21,100	(1870)	18,300
Engineering	30,700	(2830)	26,340
Computer Programming	29,600	(2810)	24,480
Business Management	20,900	(1740)	18,444
Statistician	24,800	(1830)	22,440
Public School Teacher	12,700	(960)	13,500
Health Professional (Other than Physician)	20,200	(840)	18,360
All College-Educated Workers	23,400	(2960)	20,562

expected salaries are greater than actual salaries. This finding confirms the presence of distorted expectations.

Compared to the CPC reported amount, students in the survey overestimated the starting salary in seven categories and underestimated in only one--public school teaching. The percentage differences between student expectations and actual starting salaries as reported by College Placement Council.

At the time of final data compilation for this study no cost-effective source of actual salaries for "overall" salary

Table 10

Difference Between Student Salary
Expectations and Actual Starting Salary

Accounting	19%
Marketing	15%
Engineering	17%
Computer Programming	21%
Business Management	13%
Statistics Management	11%
Health	10%
Teachers	-6%

expectations could be obtained. The available U.S. census data sources included both college-educated and noncollege workers in the data. That resulted in an inappropriate basis for comparison to college students' expectations. However, the expectations data of the sample were compiled, and the results are shown in Table 11, even though no basis of comparison is available to provide a means of inferring if expectations distortion is present. This data represent student expectations for each occupation of overall college-educated worker earnings-regardless of experience level.

Compared to the beginning salary expectations, the overall salary expectations have relatively larger standard deviations. This indicates that students are less consistent and less certain in long range earnings forecasts than they are in short range earnings forecasts.

The results of this study indicate the need for more accurate information to help all students plan education and career choices. Merely providing accurate earning opportunity information in the schools would provide some help toward improving the quality and quantity of persons entering teaching. At least some individuals who now choose nonteaching position based on distorted expectations of earnings would alter their decisions in the fact of revised information.

Table 11

Mean Student Expectations of Overall
College-Educated Worker Earnings

Occupation	Expected Earnings	Standard Deviation
Accounting	39,500	3,120
Marketing	36,600	2,920
Engineering	41,200	3,560
Computer Programming	39,300	4,060
Business Management	30,100	4,100
Statistics	29,300	3,510
Public School Teacher	17,400	1,920
Non-Physician Health Professional	25,600	1,280
All College-Educated Workers	35,100	4,360

Qualitative Case Study of Students Who Do Not Choose Teaching

To further understand the factors that influence persons to decline teaching as a career, Barnett Berry undertook a series of in-depth interviews with college students who had chosen non-teaching majors. A case study methodology was used to explore the career aspirations and expectations of a range of college seniors in diverse institutions in the Southeast. Institutional sites were selected to reflect a range of sizes, geographic settings, and economic, social, and demographic characteristics. Six institutions were selected. They were located in North Carolina, South Carolina, and Florida.

Students who were majoring in high-demand fields were the primary focus of the study. Emphasis was also placed on interviewing high-achieving students, since school officials are particularly interested in understanding the causes of declining academic ability of those who enter teaching. Eighty students in the major fields of Business (20), Chemistry (17), Math (14), Physics (10), Engineering (8), Biology (5), Sociology (2), Psychology (2) and English (2) were interviewed.

The participants were selected by nomination of their respective department chairs. SAT scores and GPAs were reported for each student participating in the study. The interviewed group was 79 percent white and 21 percent black; 79 percent were 21-22 years old, and 50 percent were male. Twenty-five percent had a GPA of over 3.75, thirty-five percent had GPAs of

3.0 to 3.75, and twenty-five percent had GPAs of 2.5 to 2.9. Thirty-five percent had scored 1200 to 1500 on the SAT test. Thirty percent had scored in the 1000 to 1190 range.

Students who were interviewed were not aware that the research was to focus on factors that motivated them not to consider public school teaching. They were told that it involved career aspirations in general.

Most students were not mercenary about their careers and were evidently interested in making idealistic contributions. The high-achieving students were more apt to display idealistic motives. The public school experiences of these students had a powerful impact upon their career decisions not to become public school teachers. They tended to be highly tracked throughout their schooling, which isolated them from other student groups and experiences. Many of the high-achieving students expressed an intolerance for academic diversity, which can be traced to that public school experience. They tended to perceive that they would be bored with teaching since they were bored as students. They viewed public school teaching as doing the same thing over and over again, and this did not meet their needs to be stimulated and challenged in their work.

The interviewed students also tended to view schools as archaic institutions where teachers were bogged down with paperwork, red tape, remedial classes, administrative incompetence, uninvolved parents, and unmotivated students.

They perceived that teachers were not free to teach because they did not have effective control of their classrooms and work conditions. The way in which students were taught, especially in high school, was a factor in discouraging interest in teaching.

Many of the interviewees mentioned teacher certification requirements as a barrier to their consideration of teaching as an option. Especially, the brightest students stated that they might like to teach for a few years before going on to other career options related to their major field. These students chose not to follow that inclination because satisfying teacher certification requirements would take away hours that could be better used to pursue major subject studies. These students also expressed disdain for the perceived content of courses in teacher training programs.

One fact came through in all of the interviews. The classroom teacher is a key actor in either recruiting or discouraging students to become teachers. There seems to be a serious morale problem among the teachers in public schools: they feel alienated, unrewarded, and misused. They feel that no one will listen to their complaints, and so they complain to their classes. Their students do listen, and they learn that one lesson well: Do not become a public school teacher. The brightest students, who may respect and communicate with their teachers more than most students, are most likely to receive the discouraging message and act accordingly.

Conclusions Regarding Recruiting and Career Choice

Three major studies were conducted under this heading. Together, they present a striking picture of the factors that have contributed to concern about the inability of teaching to attract large numbers of capable entrants. Of primary importance is the role of the present cadre of classroom teachers. These strategically placed individuals are key actors in the teacher recruiting process. Currently, their poor morale is discouraging their most able students from considering teaching as a career. If the attractiveness of teaching for today's students is to be improved, consideration must be given to improving current classroom teachers' morale and willingness to encourage their students to become teachers. These studies have shown that subjective factors and attitudes may be more important than salary as an influence on career decisions.

To the extent that salary is an important consideration, the distorted earnings expectations finding is significant. Merely raising teacher salaries will do little to improve the attractiveness of the field unless students are aware of actual salary comparisons across fields. The case studies showed that salary may not be the only area in which perceptions of students are distorted. The nonmonetary characteristics of a job are important in career decisions. Historically, teaching has relied on a positive image of occupational prestige and work conditions to attract entrants despite lower relative salaries. The findings of the case studies indicate that the positive image of the past may have been reversed. Whether based on fact or not, perceptions of undesirable work conditions and lack of status are matters that policy makers must consider. Information to aid high school and college students to better understand occupational alternatives (in terms of salary and otherwise) should be given careful attention in planning an overall strategy to improve teacher recruiting.

Finally, there is the matter of recruiting itself. Very little real recruiting is being done. Recruiting involves more than placing an advertisement in a newspaper a month before school starts. Recruiting should be viewed as a long-term process of developing, screening, and recruiting prospective teachers. It must be conducted continuously and based on accurate forecasting of needs, market supply information, and a comprehensive occupational marketing plan. Marketing is indeed the operative word: Public schools must "sell" teaching as a rewarding and desirable occupation in order to attract the most capable persons--those with other alternatives--into the field.

SECTION FIVE: TEACHER ATTRITION

Description of Research Context

A frequently heard theme is that teachers are leaving the field in large numbers to accept high-paying jobs in other fields. It is usually averred that the best teachers and those in science and math are leaving teaching most quickly. In view of the frequency with which such statements are made, it was surprising to find that state departments of education in the Southeast had little information on the quantitative dimensions of turnover and no information on qualitative dimensions (who leaves and why). Remedying this lack became a goal of the Council-sponsored research project. Two studies were undertaken. One was an attempt to gather reliable and up-to-date information on actual turnover rates at the local district level. The other was an interview-based qualitative study of teacher resignations--why they resigned and where they went. The quantitative study of turnover rates was conducted by Bird. The qualitative study was conducted by Berry. The detailed report of Berry's study has been published by the Council under separate cover.

Quantitative Study of Teacher Turnover

One hundred local school districts from across the twelve southeastern states were randomly selected to participate in the turnover study. The districts in the sample were stratified to reflect urban and rural districts. Stratification was based on district student population. Districts with less than 5,000 total students (ADA) were classified as rural. Those with over 5,000 students were classified as urban. Fifty districts from each classification were selected randomly. Forty-six districts that fell within the urban category returned survey forms. Thirty-seven districts in the rural category returned survey forms.

Each district was asked to provide the information shown on the sample survey form in Figure 5. The survey defined turnover as all classroom teachers who had left the payroll during the period October 1, 1983 - September 30, 1984. The districts were asked to categorize those employment terminations as caused by resignation, retirement, dismissal, or death. The districts were also asked to identify elementary teacher terminations. When data were compiled, the balance of the total not accounted for by the elementary teacher amount was attributed to secondary teacher turnover. The districts were also asked to identify the number of terminations that involved teachers who taught one or more classes in science or mathematics.

The data were compiled separately for the rural and urban district groupings. This provides distinct turnover rate estimates for each category. A composite category of all districts was then created using a weighted data-pooling technique. The weighting device used to construct the pooled

Figure 5

Turnover Survey Form

SOUTHEASTERN REGIONAL COUNCIL 1984 TEACHER TURNOVER SURVEY

Name of local school district: ____________________________

County: ______________ State: ____________________________

Total number of classroom teachers employed on or about Oct. 1, 1983: ____________________________

Total number of teachers who left employment after Oct. 1, 1983 and before Oct. 1, 1984: ____________________________

Number retired ____________
Number resigned ____________
Number deceased ____________
Number dismissed ____________

Total number of persons teaching one or more classes in science or math subjects on or about Oct. 1, 1983: ____________

Total number of science and math teachers who left employment after Oct. 1, 1983 and before Oct. 1, 1984: ______________

Number retired ____________
Number resigned ____________
Number deceased ____________
Number dismissed ____________

Total number of persons teaching one or more classes in science or math subjects on or about Oct. 1, 1984: ______________

Total number of persons teaching elementary level grades (either regular or special) on or about Oct. 1, 1983: ____________

Total number of elementary teachers who left employment after Oct. 1, 1983 and before Oct. 1, 1984: ______________

Number retired ____________
Number resigned ____________
Number deceased ____________
Number dismissed ____________

Total number of persons teaching elementary level grades on or about Oct. 1, 1984: ____________________________

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data set was size of district instructional staff.

Table 12 shows the results of the turnover survey. The composite turnover rate of 8.03 percent is not significantly higher than rates reported in national studies ten and twenty years ago (NEA, 1963, 1979). It is also noteworthy that the math and science teacher turnover rates are not significantly higher than other turnover rates. The rural turnover rate (6.32 percent) is significantly lower than the urban turnover rate (8.89 percent).

Table 12

Results of Teacher Turnover Survey

Composite (n= 93)

	Mean Percent	Median Percent	Std Dev Percent	Q1 Percent	Q3 Percent
Total	8.03	6.31	2.17	4.17	8.72
Elem	6.87	5.83	2.21	4.41	8.26
Secondary	9.21	7.74	3.44	6.00	10.40
Math/Sci	8.51	7.02	2.91	6.10	10.34
Urban (n=46)					
Total	8.89	6.50	2.51	4.20	9.17
Elem	8.23	7.64	2.48	6.19	9.06
Secondary	10.11	9.56	3.73	6.11	11.93
Math/Sci	9.10	7.73	3.05	7.27	12.51
Rural (n=37)					
Total	6.32	6.03	1.96	4.11	8.04
Elem	5.03	4.89	2.05	3.34	7.21
Secondary	7.01	6.37	2.92	5.72	8.85
Math/Sci	6.84	6.29	2.74	5.23	8.67

The causes of turnover are noteworthy. Sixty-six percent of teacher turnover is by resignation. This does not mean that such a proportion of teachers is leaving the field. The survey focuses on turnover at the district level. Many resigning teachers may return to teaching in another district. Data on that aspect of the problem are provided by Berry's study, reported below.

Conclusions Regarding Teacher Turnover

The turnover survey provides paradoxical evidence regarding the current crisis in teaching. The degree of alarm expressed in many recent reports had led the investigators to expect significantly higher turnover rates. The fact that math/science teacher turnover rates are not significantly higher than other teacher turnover rates is also significant. The survey indicates that the problem of inadequate teacher supply arises at the occupational choice/entry point in college rather than arising from a mass exodus of established teachers. The turnover survey indicates that despite what teachers may say about dissatisfaction with salaries and working conditions, they are not leaving their present jobs in large numbers. Instead, they are staying in the classroom, possibly regretting decisions they made in college and, by their attitude, dissuading the next generation from choosing teaching careers.

Qualitative Study of Teacher Resignations

A case study of teacher attrition in one metropolitan school system in the Southeast was undertaken to describe which teachers left, why, and where they went. Although the study was limited to one large urban school system, the findings provide a basis for increased understanding of the multifaceted dimensions of the teacher labor market. Findings indicate that those relatively few teachers who did leave and the fewer who left because of dissatisfaction were not doing so primarily because of low salaries and lack of career advancement.

The school system studied was located in a metropolitan area with a median family income of $22,000. The school system employs 4,000 teachers, 70 percent of whom are white and 30 percent, black. During the 1983-84 academic year, 210 persons resigned. Of these, 82 were contacted and interviewed by telephone. Of the remainder, 45 responded to the mail questionnaire. They included: elementary teachers (16 percent), special education/speech teachers (13 percent), math teachers (13 percent), English teachers (9 percent), vocational teachers (9 percent), science teachers (7 percent), and physical education/health teachers (7 percent). In terms of grade levels, more junior high teachers left than any other group. Of the 127 respondents in this study, 24 percent left because of retirement/health reasons, 21 percent because of job dissatisfaction, 20 percent because of spouse moves, 15 percent because of other family obligations, and 9 percent because of business opportunities.

Of the teachers who left that system, 69 percent are either teaching elsewhere or retired (not working). Nine percent have taken jobs in sales (primarily real estate and insurance), seven percent are self-employed, five percent are teaching in private industry training programs, four percent are students, and three percent have become school administrators in other districts. While only 31 percent left for other occupations, even fewer left for higher paying ones. In fact, the respondents tended not to mention money as a factor in either attracting or retaining teachers. The primary focus of their reasons for leaving was working conditions. These included administrative problems, student discipline, classroom control, large classes, extracurricular duties, uncooperative parents, and stressful atmosphere.

This study highlighted the need for policy makers to understand and monitor teacher attrition very closely. School systems are often unaware of teachers' plans to leave until the last moment. School systems tend not to keep track of resigning teachers and do not know much about the quality dimensions of teachers who leave. Teachers contacted for interview seemed pleased and surprised that someone was interested in their resignations. Most were anxious to talk to someone about their feelings and concerns for the school system.

Conclusions Regarding Teacher Attrition

The Council's research in this area found that fewer teachers than expected seem to be actually leaving the field for other jobs. Teacher attrition involves several avenues for exit. Those who resign do not all take jobs outside of teaching. Many either stay home to take care of their family duties or find a job teaching in another district. The findings for mathematics and science teachers indicate that the current teacher work force in those critical fields may be aging. Replacements are not being attracted at a rapid pace.

Overall, turnover is less than ten percent in most cases, which is encouraging--teachers are not leaving in droves. This indicates that the critical need for general policy action may not be in the area of teacher retention. Rather, the real need may be to attract more and better new entrants to the market.

SECTION SIX: TEACHER COMPENSATION RESEARCH PROJECT

Context of Teacher Salary Concerns

Teachers are not paid enough. This statement has been repeated in task force reports, public commentary, and policy discussion for the past two years as our nation has tried to explicate and remedy the general perception of a crisis in education. Inadequate teacher pay has been cited as the cause of declining quantity and quality of the teacher work force. Increasing teacher pay has been identified as a primary policy option for improving the quality of the teacher work force and thereby improving the quality of public school education.

Given the emphasis that has been placed upon raising teacher salaries, it is important that education researchers and policy makers carefully and systematically attempt to answer the question, "How much?" The research into teacher pay conducted by the Southeastern Regional Council was designed to offer answers to that question. The research involved two levels of activity. The first was to develop a theoretical framework for analyzing teacher pay issues. The second activity was to apply that framework to empirical data and to derive practical estimates that will be useful for planning salary policies. The research into the teacher pay issue has been published in Bird's paper, "Competing for Quality: An Analysis of the Comparability of Teacher Salaries to Earning

Opportunities in Other Occupations."

The approach used was to compare teacher salaries to salaries in other occupations. The concept of paying teachers a salary comparable to earning opportunities in other occupations will be familiar to persons who have followed the recent literature of the teacher pay issue. It underlies Weaver's analysis of the apparent decline of academic quality of teachers (Weaver, 1983). The idea that teacher salaries must be competitive with other opportunities was expressed by Feistritzer in her 1983 study of teachers (Feistritzer, 1984). The need to increase teacher salaries competitively with opportunities in other sectors was expressed by Darling-Hammond in the recent Rand Corporation report (Darling-Hammond, 1984).

Maintenance of a competent teacher work force requires that earning opportunities in the profession be comparable to those in competing occupations. Economic theory clearly establishes that any resource will tend to flow toward the more highly remunerated use, other things being equal. That proposition applies to human labor resources just as it does to other kinds of productive resources. The difficulty in applying the proposition arises because the "other things" that enter the economic calculus seldom are equal between two alternative occupations. This is especially likely to be so in the complex area of human resource allocation decisions, which are strongly influenced by tastes, preferences, expectations, and social custom. The economic comparisons involve a large element of subjective value judgments by the decision makers. It is easy to say: "Make teacher pay comparable to other fields." The hard job of policy analysis is to define the terms of comparison, to identify the basis of comparison, and to discover factual data upon which to base a comparison.

The data, the methods of analysis, and the conclusions of pay comparability analysis should be updated annually to ensure that the teaching occupation attains and maintains the ability to attract competent and skilled individuals in competition with other occupational alternatives. Only by continual analysis of the market and appropriate adjustment of policies can education break out of the pattern of recurring cycles of supply crises that have characterized the occupation for the past eighty years (Weaver, 1984). Although the analysis reported here is specifically applicable to the twelve-state region served by the Southeastern Regional Council, the methods and data sources may be easily extended to other regions or to the nation as a whole.

Key elements of the theoretical model of pay comparison analysis that have been adopted for this research are:

1. Choice is individual, and different individuals evaluate and react to the same objective circumstances in different ways.
2. Choice is based on expected benefit, implying an element of risk and uncertainty in the decision process.

3. Choice derives from an individual's perception of facts and alternatives, implying that accuracy and availability of information are important in the decision process.
4. Choice involves examination of both costs and benefits of the prospective objects, implying that the individual weighs the difficulty of entering alternative occupations and evaluates his/her own abilities.
5. The economically meaningful concept of compensation that influences occupational choice includes fringe benefits, perquisites, working conditions, and social status in addition to monetary pay.

It is especially important that policy makers be sensitive to the role of the nonmonetary elements of compensation that influence occupational choice. These elements include the psychological and emotional effects of the occupation (either positive or negative); the social prestige, respect, or status that an occupation may carry; the power or responsibility that an occupation may involve; and the leisure time that an occupation may provide. For shorthand purposes, the nonmonetary elements may be characterized as the "amenities" of an occupation. An individual's evaluation of an occupational alternative also involves elements that may be broadly classified as costs of entering an occupation. These "costs" include the individual's perception of the expense and difficulty of preparing himself/herself (through training, apprenticeship, etc.,) for the occupation and the institutional barriers that must be overcome to enter the occupation. If, in choosing between two occupations, an individual perceives the amenities and costs of each of the alternatives to be similar, then he will choose the occupation having the highest expected monetary compensation. Of course, in practice the nonmonetary amenity and cost elements in an individual's choice between occupations are seldom equal. This inequality of amenities (or costs) leads to unequal monetary pay between occupations that are open to similar groups of individuals. Individuals who see one occupation as offering greater nonmonetary benefits than another occupation will tend to sacrifice some pay in return for the opportunity to enter the occupation offering the more favorable amenities or smaller costs. If two occupations are viable alternatives for similar persons and if there exists a difference in the monetary pay in the occupations, but there does not appear to be a tendency for labor supply to flow away from the lower-paid alternative and into the higher-paid alternative, then the difference in pay is a measure of the value to the marginal worker of the greater nonmonetary amenities or lower costs of entering the lower-paid alternative.

In choosing teaching over another occupation, "as a rule, a man relinquishes, not what he is earning outside of the school, but what he thinks he could earn" (Clark, 1899, p. 116).

The first step in conducting a pay comparability analysis is to ask the following question: Based on a set of relevant characteristics describing the persons presently employed as teachers, what annual salary could such persons earn on average in alternative occupations that might be open to them? Note, the comparison is not to any particular alternative occupation, but to a composite of the variety of alternatives that are available. Since teaching is a field that draws upon a broad array of skills and abilities (the requirement for a college degree is the only clear-cut common denominator), the appropriate basis for comparison is the composite of employment opportunities for all college-educated workers. Since costs of living and labor market conditions vary regionally, the basis of comparison for this study was limited to alternative earning opportunities for college-educated workers in the twelve Southeastern Regional Council member states.

The research question, "What annual salary could the typical teacher earn in a nonteaching job held by the average college-educated person?" is only the first step. It provides a basis for comparison, but does not define specifically what a proper or "competitive" teacher salary ought to be. That ultimate determination requires adjustment of the figure found as the initial basis of comparison to account for the positive and negative nonpecuniary rewards of teaching in comparison to other fields. As discussed above, that adjustment involves consideration of the value of leisure time, job security, work conditions, fringe benefits, etc. A policy maker considering adoption of a teacher pay plan should also ask whether the existing work force is in fact the work force that the public wishes to retain and reproduce. If the desire is to develop a work force with different characteristics, then the pay comparability analysis should be conducted with reference to the alternative earning opportunities of the group of persons with the desired characteristics, rather than with reference to the present work force.

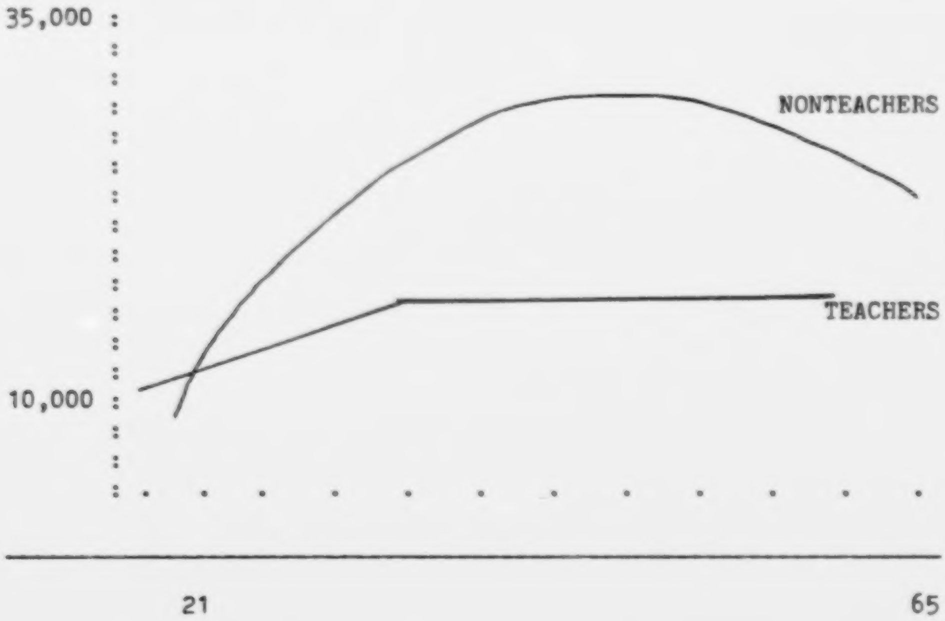
The data used for this analysis was found in the individual record file of the March 1983 Current Population Survey of the U.S. Bureau of the Census. The total file consists of a representative sample of the U.S. civilian population between the ages of 17 and 65. The total data set contains approximately 180,000 observations. Each observation record contains information regarding employment status, education, occupational category, earnings, age, place of residence, other persons in the household and their employment and earnings, and sociodemographic variables for an individual. The file was read to extract all observations of college-educated salaried workers residing in the twelve Southeastern Regional Council member states. Self-employed workers were not included because the earnings of such individuals often include a remuneration for capital as well as labor and so would be inappropriate for a comparison to teacher salaries. Persons who did not work during the previous twelve months (whether voluntarily or involuntarily) were excluded. Since the data contained information regarding hours and weeks worked that could be used in the analysis, part-time workers were not excluded. Altogether, 3,800 records were compiled and analyzed. The observations were partitioned between persons in occupations other than teaching (3,383) and public school teachers (373). Observations of 44 nonpublic school and kindergarten teachers were excluded.

The current population survey data showed that among college-educated workers in the Southeast who were in nonteaching occupations, the average wages earned during the twelve months previous to March 1983 totaled $20,927. Note that persons who worked as few as 30 hours per week on average and as few as 40 weeks per year were included in the sample. The regression analysis on the data, described below, controlled for weekly hours worked and weeks worked per year. For the 373 teachers in the sample, the average wage earnings during the twelve months prior to March 1983 were $16,793.

The data were also analyzed by age group. It was found that the disparity between the average earnings of teachers and the average earnings of other college-educated workers increased significantly with age. This was especially the case for persons in the age group of 30-50. Figures 6 and 7 illustrate the earnings differences observed by age group, based on regional averages. Table 13 provides exact amounts of teacher salaries for each southeastern state.

Figure 6

Comparison of Earnings of Teachers and
Other College-Educated Workers by Age Group



Among the nonteacher group (3,383 observations), 60.2 percent were male and 39.8 percent, female. Among the public school teachers' (373 observations), 20.4 percent were male, and 79.6 percent were female. The racial composition of the nonteacher group was 88.6 percent white, while the teacher

Figure 7

Teacher Salary Deficiency By Age

Age Group	Average Salary Deficiency
21-25	3,725
26-30	3,813
31-45	4,210
36-40	8,254
41-45	8,738
46-50	11,350
51-55	12,305
56-60	11,806
61-	15,599

Teacher Salary Deficiency By Education

	Average Salary Deficiency
B.A. Degree	5,957
B.A. + 1 year	7,860
B.A. + 2 years	8,890

Teacher Salary Deficiency By Sex

	Average Salary Deficiency
Male	12,028
Female	5,932

sample was 79.6 percent white. The average age of the nonteacher sample was 36.7 years, and the average age of the teacher sample was 38.3 years.

Table 13

Average Annual Teacher Salaries for 1981-82 and 1982-83 by Southeast State

State	1981-82	1982-83
Alabama	$15,600	$17,900
Arkansas	$14,501	$15,029
Florida	$16,780	$18,538
Georgia	$14,978	$15,900
Kentucky	$17,294	$18,384
Louisiana	$17,930	$18,400
Mississippi	$14,135	$14,320
North Carolina	$16,614	$17,801
South Carolina	$15,615	$16,430
Tennessee	$16,582	$17,697
West Virginia	$17,129	$17,322
Virginia	$17,009	$18,535
Southeast Region Composite	$16,303	$17,463

Source: American Federation of Teachers

To develop an estimate of the alternative earning opportunities for teachers, the observations of nonteachers in the sample (3,383 observations) were analyzed using a multiple regression procedure. The object of the analysis was to explain the earnings of individuals in terms of a set of variables that could be related to descriptors of the teacher labor force. The characteristics of the teacher work force (existing or desired) can be defined in terms of values of the explanatory variables in the wage regression model. When the variable values describing the teacher work force are substituted into the estimated regression equation, the result is a dollar amount that may be interpreted as the expected mean annual earnings for an individual with the described characteristics working in the general labor market for college-educated workers in the southeastern region. Based on the CPS data as a representative sample of workers in the Southeast, the model, in effect, produces a composite picture of earning opportunities in the various specific occupations. The earnings associated with each occupation are represented in the composite earnings amount in the same proportion (inferred from the sample) as that occupation's employment level is related to total employment of college-educated workers. Because the teacher work force is very large and requires a broad range of education and skills, it seems more appropriate to compare teacher earnings to a composite for the earning opportunities for college-educated workers, rather than to one specific occupational alternative.

Estimates of earnings alternatives were based on data in the March 1983 CPS and represent earnings for the twelve months prior to March 1983. Inflation of prices and wages has continued since that time. Based on the average of the GNP implicit price deflator for the year prior to March 1983 and the value for the most recently available month, it is estimated that an upward adjustment of no more than 7 percent would update the estimates to November 1984 equivalents.

The multiple regression analysis of the 3,383 observations of nonteaching college-educated workers was conducted using annual wage earnings as the dependent variable and the following independent variables: (1) education in years, (2) work experience in years, (3) total number of weeks worked during the previous twelve months, (4) sex, (5) race, (6) marital status, (7) average hours worked per week during the past twelve months, and (8) location of the workers in terms of the central city of a standard metropolitan statistical area (SMSA), a suburban county within an SMSA, or a county not in an SMSA. The variable education in years is defined on a scale that defines kindergarten as "1." Therefore, a twelfth grade high school education corresponds to 13 years of education in the CPS data, and completion of four years of college is entered as 17. Since completion of a degree program may have an effect on earnings in addition to the effect of the number of years of education, a second education variable was derived to capture some of the degree status effect. That second variable, denoted "Colled" in the model, was defined as 0 for individuals with less than 17 years of education and as 1 for individuals with more than 17 years of education as reported in the CPS observation. The square of the "experience" variable was also included in the model to allow for a possible nonlinear relation between earnings and age/experience. Several alternative specifications of the model were attempted. The one that seemed to fit the data best expressed the logarithm of annual earnings as a linear function of the independent variables. The estimated equation is shown in Table 14. The R^2 statistic for the regression was .67.

When variable values denoting the characteristics of the average college-educated (EDUCYRS=17) worker in full-time (WEEKWKD=52) nonteaching occupations are substituted into the equation, the predicted annual earnings amount is $20,424. When variable values denoting the characteristics of the average teacher in the CPS sample are substituted into the equation, the predicted annual earnings amount is $17,893. Both amounts are above the average teacher pay amount for the CPS sample.

The teacher work force is less male (20 percent, compared to 60 percent), less white (79 percent, compared to 89 percent), and less urban (44 percent, compared to 60 percent) than the nonteacher work force. These factors reduce the predicted earnings of the teacher group in nonteaching alternative occupations despite the fact that teachers are slightly more educated than nonteaching workers. One of the facts about the U.S. labor market is that nonmale, female, rural workers have lower earning opportunities than male, white, urban workers with the same experience and education.

The model developed for this paper indicates that teachers may be receiving salaries reasonably comparable to their nonteaching alternatives when viewed in the context of the sociodemographic characteristics of the existing teacher work force. However, that comparison may be inappropriate if the presence of sex or race discrimination (in pay and in employment opportunity) in other occupations has contributed to the higher proportion of females and nonwhites in teaching. Education policy makers must consider that question in order to choose an appropriate basis for salary comparison. If one adopts the sociodemographic characteristics of the nonteaching labor force (60 percent male, 89 percent white, and 60 percent urban) as the basis for comparison, but adopts the education (17.67 years) and age/experience characteristics of the teacher work force, the comparable earnings amount is $20,895. The interpretation of that figure would be that a person with the education and age/experience characteristics of the typical teacher, but with other sociodemographic characteristics typical of the nonteaching work force, would be able to earn an expected annual salary of $20,895 in a full-time (52 weeks) nonteaching

Table 14

Regression Equation Relating Annual Earnings of College-Educated Workers in Nonteaching Occupations to Various Independent Variables

---

Ln(Wage) = 4.690499 +.027274*EDUCYEARS +.031647*EXPER +.049476*WEEKWKD
+.307948*SEX +.097077*RACE +.120117*MARRIED +.079096*INCITY
+.164076*SUBURB +.031052*HOURWKD +.154125*COLLED -.0005*EXPERSQR

Where

Ln(Wage) = the natural logarithm of annual wage earnings

EDUCYRS = education in years beginning with K=1

EXPER = age minus EDUCYRS minus five

WEEKWKD = total weeks worked during twelve months prior

SEX = value of 0 denoting female; value of 1 denoting male

RACE = value of 0 denoting nonwhite; value of 1 denoting white

MARRIED = value of 0 denoting not married; value of 1 denoting married

INCITY = value of 0 if respondent not a resident of central city of SMSA; value of 1 if respondent is a resident of central city of SMSA

SUBURB = value of 0 if respondent not a resident of suburban county of SMSA; value of 1 if respondent is resident of suburban county of SMSA

HOURWKD = average hours worked per week previous twelve months

EXPERSQ = the square of the value of the variable EXPER

---

occupation. That amount is an increase of over $3,000 per year above the reported regional average salary for teachers in 1982-83. If the basis of comparison were changed to reflect earning opportunities on a male-only basis (holding other characteristics constant), the comparable earnings amount would be $23,640.

The argument for raising average teacher salaries to the upper end of the range (approximately $23,000) is supported by evidence from another source. The model of teacher supply decision probability described previously allows one to substitute alternative average salaries into the probability density function and derive implied teacher supply totals. That model was estimated on a different basis and using different techniques from the salary comparison model described in this section. Therefore, it provides an independent check on these estimates. At current average salary levels, the supply model indicated that the total supply of teachers would eventually be much less than the number presently demanded by public schools in the South. As the average salary is raised in the model, the supply, of course, increases. At an average salary level of $25,420, the supply model predicted that the supply of teachers would equal the present demand level of 507,000 teachers in the region. According to the supply model, that salary level would represent a stable equilibrium value for the market, ensuring an adequate supply of teachers to fulfill the requirements of southeastern public school systems. The fact that both estimation procedures produced salary recommendations in the $20,000 to $25,000 range provides strong evidence on which effective policy might be based.

Supplemental Earnings of Teachers

Teaching, more than most occupations, offers a work schedule conducive to holding supplementary employment (moonlighting). Many teachers complain that low teaching salaries force them to work in the after-school hours, at Christmas break, and during summers to compile a liveable income. State education agency planners admit to the expectation that teachers will work during summers. Bird has observed that when state education officials offered evidence of competitive alternative earning opportunities based on full-time work in other fields, they typically responded that a "reasonable" teacher salary should be only ten-twelfths of the amount presented. Based on such experience, it was decided that an element of research was needed that examined the supplemental earnings experience of teachers.

Patrick Cotter, Director of the Capstone Poll organization of the University of Alabama, was engaged to conduct a survey of five hundred randomly selected school teachers in Alabama. The survey was designed to determine which teachers work at extra jobs, what kind of jobs they hold, and how much they earn. A total of 504 teachers were contacted by telephone from randomly selected lists supplied by the Alabama Department of Education.

A majority (55 percent) of the respondents replied that they did hold supplementary jobs during the previous year. The overwhelming reason stated was need for additional income. Teachers over the age of 30 were found most likely to supplement their income. Males, urban residents, and those with a large number of dependents were also most likely to take extra jobs. Among male teachers, 86 percent supplement, while only 48 percent of female teachers do so. Mathematics teachers were found to be most likely to seek additional jobs.

The most popular type of supplementary job was in teaching. These jobs included tutoring, teaching summer school, or teaching in evening programs. They accounted for 39 percent of the jobs held. Service and sales jobs were second in popularity: 35 percent held such jobs, and another 13 percent held clerical jobs.

Of these, 54 percent worked less than 20 hours per week; 22 percent worked 21-39 hours per week; and 23 percent worked forty hours or more per week at supplemental jobs. Interestingly, 35 percent worked fewer than 10 weeks per year. Among these teachers, 35 percent stated that second jobs provided less than 5 percent of their total income; 48 percent earned 6-20 percent of total income from moonlighting. Another 17 percent earned over 21 percent or more of their total income from such employment. Almost two-thirds of the teachers with second jobs earned $2,500 or less per year from such work (Cotter and Hardee, 1984).

Fringe Benefits

Rodney H. Mabry, C. M. Lindsay, M. T. Maloney, and B. H. Mabry of R. B. M. Research, Inc., were engaged as subcontractors to conduct a study of the value of fringe benefits of teachers in the Southeast in comparison to fringe benefits in other occupations. The results of their study are summarized below and resented in their final report entitled "Fringe Benefits Available to Public School Teachers in the Southeast" published by the Council. Their research analyzed the major fringe benefits available to teachers in the Southeast, assessed the value of summar leisure for teachers, and examined teacher fringe benefits, typical salary, and total compensation in comparison to other industries. They found that:

> The average value of nonsummer fringe benefits is $6,568, which is 31 percent of salary. The mean value of summer leisure is anothe $2,653 or 13 percent of total salary. Thus, the total fringe benefits on average in the region are valued at $9,221 or 44 percent of typical salary . . . .
>
> When compared to firms located in the Southeast where fringe benefits are slightly less, or about 33.9 percent of payroll, either comparable figure for teachers (31.2 percent without summer as a benefit and 43.8 percent with summer leisure included) seems respectable at worst and quite advantageous at best . . .
>
> These averages also conceal important information within the region regarding teacher benefits. Fringe benefits for teachers in particular states vary significantly, and some care should be taken when generalizing across

> all states in the region. It is still true, however, that in no state, when the value of summer leisure is included, does the fringe-benefits-to-salary percentage for teachers fall short of the same figure for either all industries nationally or the southeastern region (Mabry, et al., pp. 168-172).

Conclusions Regarding Compensation

The findings in this section indicate that unless education policy makers ascribe to extremely high estimates of the value of the net nonpecuniary benefits of the teaching occupation (job security, working conditions, etc.), the task of making teacher salaries comparable to and competitive with the nonteaching earning opportunities for workers in the Southeast will require a significant commitment of additional resources to teacher pay. The alternative is for teaching to be perceived as a less attractive occupational choice for persons' entering college and choosing courses of study that commit them to certain occupational tracks. Such an alternative would contribute to a continuing decline in the quantity and academic quality of persons entering the teacher market. Only the comparison based on replication of the sociodemographic characteristics of sex and race in the teacher labor market presents a comparison amount close to current salary levels. Adopting that basis of comparison for policy purposes would place education agencies in the untenable position of either denying the existence of a history of sex and race discrimination in southeastern labor markets or of exploiting the effects of such history. In any event, the present trend toward erasing those sex- and race-linked earning opportunity disadvantages will eventually raise the alternative earning opportunities for teachers regardless of the sociodemographic basis used for the analysis. This consideration is particularly important for setting salary levels that will be attractive to new labor market entrants. Today's college student, regardless of sex or race, is more likely to look at the white male earning opportunities in choosing an occupation than in the past.

It has not been the intent to specify what the correct salary level for teachers might be. The major conclusion has been that salary competitiveness is a matter of degree, not of absolute right or wrong. Some very competent individuals will choose to enter teaching even at very low salary levels because they place high personal values on the nonpecuniary rewards and benefits of the occupation. Higher salaries increase the probability that the quantity and quality of persons entering the field will increase. That probability is hypothesized to increase continuously as salary is varied upward. The rightness of any particular salary level also depends on the value judgments of education policy makers regarding the size and quality of the teacher work force that is necessary to achieve their vision of society's educational goals.

SECTION SEVEN: SUMMARY CONCLUSIONS, AND POLICY RECOMMENDATIONS

Summary of Project Findings

This teacher labor market research project was comprised of ten separate research studies. Each studied an element of the overall complex picture. Several of these investigated aspects that have previously received little attention. The major findings of these research studies were:

Review of existing teacher labor market information and analysis. Available information compiled at state level and from other sources is insufficient and/or inadequate to guide education leaders toward effective teacher labor market policies.

Estimation of teacher labor market supply function and simulation of results. Current wage levels and other market conditions will probably lead to a drastic shortage of teachers if they remain in effect over the long term.

Qualitative study of career choice, attitudes, and recruiting. Teachers are key actors in the process of recruiting the next generation of teachers. Further, many teachers regret their career decision to enter teaching and tend to discourage their students from considering the field. Also, school systems rarely plan personnel needs and recruiting strategies as long-term endeavors. Most of their recruitment of teachers is conducted on a point-of-need basis.

Earnings expectations study. College students hold overly optimistic expectations about the average starting salaries and overall earnings levels in many nonteaching occupations.

Qualitative study of college students who do not choose to be teachers. Many academically able students who would like to consider teaching as a temporary occupation rather than a lifelong career indicated that teacher training and certification requirements are a significant discouraging factor. Others regarded teaching as unchallenging and were discouraged by classroom conditions, parental and student attitudes, and bureaucratic details.

Teacher turnover study. The average teacher turnover rates were not particularly high, and the turnover rate for math and science teachers was not significantly different from the turnover rate for other categories of teachers.

Qualitative study of teacher resignations. Most resigning teachers leave because of family considerations or to accept another teaching position elsewhere. Resignations to accept jobs in other fields were fewer than might have been expected on the basis of recent public commentary. Few of the resignations that were tied to career changes were associated with moves into high-technology fields.

Earnings comparability study. The present average level of teacher salaries is $3,000 to $6,000 below the levels that would be necessary to make the occupation competitive with other career alternatives for college-educated workers in the Southeast.

Supplemental earnings study. The majority (55 percent) of teachers surveyed in Alabama engaged in some type of outside work to supplement their teaching salaries, but the average earnings from such efforts were less than $2,500.

Fringe benefits study. The average value of fringe benefits for teachers in the Southeast is comparable to fringe benefit packages offered by firms in the region. Teachers' fringe-benefits-to-salary percentage that includes the value of summer leisure is higher than for nonteachers; without the value of summer leisure, the percentage in only slightly lower than for nonteachers.

Conclusions

The findings of this research confirm what others have also found: The public schools are on the verge of a crisis in terms of both quantity and quality in the teacher work force. Shortages of teachers in key areas are already emerging, and a general teacher shortage is likely in the early 1990s.

A major source of the emerging teacher shortage seems to be at the career entry decision point: Most college students are deciding not to become public school teachers. It is the entry rate rather than the turnover rate that seems critical to the future supply of teachers in terms of both quantity and quality. More policy action needs to be directed toward improving the entry rate.

There are several reasons that seem to contribute jointly to the low entry rate to teaching. One is salary, both starting salary and overall average. Interestingly, however, the starting teacher salary levels, in fact, are not as unattractive as many students think that they are. Students' inflated expectations about starting salaries in other occupations may be an important contributor to the low teaching entry rate.

Perceptions of low teacher salaries also play a direct role in student's career choice decisions. The findings indicate that potential new entrants to the field consider both the beginning salary and the long-term salary growth potential. The salaries for both are not competitive, but the disadvantage in the second category seems especially significant. Many policy makers have discussed the need for a teacher salary schedule that allows the potential for significant salary growth. That policy recommendation has usually been offered in the context of retaining experienced teachers. This research indicates that the teacher turnover problem may be of a relatively lower order of importance. The presence of long-term salary growth potential could be important for attracting an adequate pool of new quality entrants to the field.

The research found that some academically able persons were not interested in teaching as a career, but as a short-term occupation during their twenties. College students who might have a short-term interest in teaching were often unwilling to devote time to a program of study (teacher training programs) that does not offer flexibility to apply to a variety of occupational outcomes. In addition, the poor reputation of college education courses discourages students' potential entry into the market. These perceptions combined with the relatively low pay opportunities may be powerful deterrants to this potential pool.

The role of low salary, work conditions, and the public's perception of teaching also contribute to current teachers' low morale. Therefore, these factors indirectly influence the career choices of students. Today's teachers are key recruiters of the next generation of teachers. Although it was found that few teachers are actually leaving the field to pursue other occupations, many wish that they could. Many of today's teachers regret their decisions to enter teaching. They pass that sense of regret along to their students. The result is a low entry rate to teaching, especially among the most academically able.

Considering how important it is to maintain the quantity and quality of the teacher labor force, it is surprising how little attention education agencies have given to the need to recruit teachers. Most recruiting strategies are local and focus only on immediate hiring needs. A long-range teacher recruiting strategy might be coordinated at the state level and would attempt to identify and recruit potential teachers before they enter college. The public schools have the attention of children for six hours per day, nine months per year, and for twelve or thirteen years. The schools are able to present the teacher as the primary occupational model available to children. With that potential recruiting advantage, it is amazing that there is not a flood of surplus teacher candidates in the market. The low rate to teacher entry may be attributed to the lack of a long-range recruiting strategy and the discouragement by teachers to their students to enter the field.

These conclusions imply a number of policy options that could be developed to improve the situation and there are also several areas in which improved information would aid in developing those policies.

Policy Recommendations

Schools must become serious about the task of recruiting teachers. This should not be approached as a point-of-need problem. Planning for staff needs should be done on a long-term basis. Schools should actively recruit outstanding students to prepare for teaching and return to the local district to teach. This strategy is essential for rural areas and would be useful for urban ones also. The role of the classroom teacher as the agent of the recruiting process should be made clear and rewarded. The process of recruiting future teachers should begin no later than the junior high school grades. Coordinated effort between colleges and local schools to ensure a supply of competent teachers is essential.

Schools should recognize that teaching may not be a lifetime career. Some teachers may make it a career, but for many young and capable people it may be a sensible and attractive short-term occupation before they move on to other endeavors. High turnover rates (15 percent to 20 percent) would not be an undersirable event if schools had access to a large supply of young entrants who desired only to teach for three to five years. This type of labor-force emphasis would reduce the proportion of burned-out teachers in the schools.

The existing teacher licensure process should be revised. Teacher certification requirements may be a barrier to many college graduates who may want to teach as a short-term occupation, as described above. If licensure programs allowed more flexible avenues into teaching, the schools would be better able to attract these capable individuals into teaching.

Working conditions are an important consideration affecting the supply of teachers. Management quality, sensitivity, and responsiveness must be enhanced to improve teacher morale and attract competent people into the occupation. Ways must be found to provide support personnel to take care of many of the duties that now interfere with the act of teaching.

These measures would go far toward improving the attractiveness of teaching and to avert the impending crisis in the teacher labor market. They are not a panacea. Improved conditions in teaching will take time and the continuing attention of researchers and policy makers. The teacher labor market needs more than a "quick-fix" approach from public policy makers. It needs serious continuing attention as the central element affecting the excellence of our educational system.

REFERENCES

ABT Associates, Inc. Planning for Physician Requirements: A Manual To Develop Physician Requirement Models for HSA's. DHEW PUblication No. (HRA) 79-12, 1979.

Akerlof, George A., Brian, G., and Main, M. "Pitfalls in Markov Modelling of Labor Market Stocks and Flows." Journal of Human Resources 16 (Winter 1981): 141-151.

Akin, James N. "Teacher Supply/Demand by Field and Region." Education Week, February 16, 1983, pp. 16-17.

Alabama Department of Education. Comparisons of Supply and Demand. Montgomery: 1982 (Mimeographed).

American Association of Colleges for Teacher Education, Task Force on Shortage/Surplus/Quality Issues in Teacher Education. The Impact of Teacher Shortage and Surplus on Quality Issues in Teacher Education. Washington: American Association of Colleges for Teacher Education, 1983.

American Federation of Teachers. Issues in Education: State Average Teacher Salaries, 1982-1983. Washington: American Federal of Teachers, 1984.

________. 1983 Salary Trends for Teachers: Survey and Analysis. Washington: American Federation of Teachers, 1984.

Antos, Joseph R., and Sherwin, Rosen. "Discrimination in the Market for Public High School Teachers" Journal of Econometrics 3 (May 1975): pp. 123-150.

Association for School, College, and University Staffing. Teacher Supply/Demand 1982. Madison, Wisconsin: Association for School, College, and University Staffing, 1983.

Association for Supervision and Curriculum Development, Task Force on Merit Pay and Career Ladders. Incentives for Excellence in America's Schools. Alexandria, Virginia: Association for Supervision and Curriculum Development, 1985.

Bakalis, Michael. "American Education and the Meaning of Scarcity." Phi Delta Kappan 63 (October 1981) pp: 102-105.

Baugh, William, and Stone, Joe A. *Trends in the Educator Labor Market*. Eugene: Oregon University Center for Educational Policy and Management, December 1980. ERIC #ED 197 490.

________. *Simulation of Teacher Demand, Demographics, and Mobility: A Preliminary Report*. Eugene: Oregon University Center for Educational Policy and Management, December 1980. ERIC #ED 013 317.

Becker, G. S. "A Theory of the Allocation of Time." *Economics Journal* 75 (September 1965): 493-517.

Benham, Lee. "The Labor Market for Registered Nurses: A Three-Equation Model." *Review of Economics and Statistics* 53 (August 1971): 246-252.

Benson, Charles C. *The Economics of Public Education*. Boston: Houghton-Mifflin Company, 1968.

Berry, Barnett. *A Case Study of the Teacher Labor Market in the Southeast*, Occasional Paper No. 413. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1984.

________. *A Case Study of Teacher Attrition in a Metropolitan School System in the Southeast*, Occasional Paper No. 414. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1985.

________. *A Case Study of College Students Who Do Not Choose Teaching as a Career Studies of Teacher Attrition*. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1985.

Bird, Ronald E. *Report and Evaluation of Current Information Regarding Teacher Supply and Demand*, Occasional Paper No. 8. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1984.

________. *An Analysis of the Comparability of Public School Teacher Salaries to Earning Opportunities in Other Occupations*, Occasional Paper No. 415. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1985.

________. *The Teaching Work Force: Research Needs and Objectives for a Regional Educational Laboratory*. (monographed) Prepared for Southeastern Regional Council for Educational Improvement, January 1985. (Mimeographed)

Blaug, Mark. Economics of Education. Hammondsworth, England: Penguin Books, Ltd., 1969.

Bloland, Paul A., and Selby, Thomas. "Factors Associated with Career Change Among Secondary Teachers." Educational Research Quarterly 5 (Fall 1980): 13-23.

Bogden, R., and Biklen, S. Qualitative Research for Education: An Introduction to Theory and Method. Boston: Allyn & Bacon, 1982.

Bredeson, Paul V., et al. "Organizational Incentives and Secondary School Teaching." Journal of Research and Development in Education: 52-56.

Business-Higher Education Forum. America's Competitive Challenge: The Need for a National Response. Washington: Business-Higher Education Forum, 1983.

California Round Table on Educational Opportunity. Improving the Attractiveness of the K-12 Teaching Profession in California. Sacramento: California Department of Education, 1983.

Carlsson, Robert J., and Robinson, James W. "Toward a Public Employment Wage Theory." Industrial and Labor Relations Review 22 (January 1969): 243-248.

Chambers, Jay G., and O'Brien, Joan. Cost Consequences of Changes in the Demographics of the Educational Work Force for Local Public School Districts. Institute for Research on Educational Finance and Governance, Program Report No. 82-B10, January 1983.

Chapman, David W., and Hutcheson, S. "Attrition from Teaching Careers: A Discriminant Analysis." American Educational Research Journal 19 (Spring 1982): 93-105.

Chang, Martha. "A Procedure for Deriving Teacher Demand Projections by Subject," Florida Department of Education Manpower Model Working Paper No. 3, Tallahassee, Florida, Copyright 1982.

Charters, W. W. "What Causes Teacher Turnover?" The School Review (1957).

________. "Some Obvious Facts About the Teaching Career." Educational Administration Quarterly 3 (Spring 1967): 182-193.

Clark, John Bates. "Salaries of Teachers." *Columbia University Quarterly* 1 (March 1899): 111-122.

College Placement Council, Inc. "Salary Survey, July 1984." Journal report prepared for the College Placement Council, Inc., Bethlehem, Pennsylvania.

Collins, T. W., and Noblit, G. W. *Stratification and Resegregation: The Case of Crossover High School, Memphis, Tennessee*. Research Performed Under NIE Contract #400-76-009, 1976.

Council of Chief State School Officers, Committee of Teacher Certification Preparation and Accreditation. *Staffing the Nation's Schools: A National Emergency*. Washington: Council of Chief State School Officers, 1984.

Cotter, Patrick, and Hardee, Betty. *Supplemental Employment Among Alabama Teachers*, Occasional Paper No. 412. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1984.

Cresap, McCormick, and Paget. *Teacher Incentives: A Tool for Effective Management*. Reston, Virginia: National Association of Secondary School Principals, 1984.

Darling-Hammond, Linda. *Beyond the Commission Reports: The Coming Crisis in Teaching*. Washington: Rand Corporation, 1984.

Deane, Robert T., and Litkowski, T. I. *The Assessment of Health Manpower Modelling Efforts and Development of Alternative Modelling Strategies*. HEW Publication No. (HRA) 77-17. Washington: U.S. Government Printing Office, 1977.

Deane, Robert T., and Ro, Kong-Kyun. *Comparative Analysis of Four Manpower Nursing Requirements Models*. HEW Publication No. (HRA) 79-9. Washington: U.S. Government Printing Office, 1979.

Deane, Robert T., and Yett, Ronald E. "Nurse Market Policy Simulations Using an Econometric Model," in Richard M. Scheffler, ed., *Research In Health Economics: A Research Annual*. Greenwich, Connecticut: JAI Press, 1979, pp. 255-300.

District of Columbia Public Schools. *A Study of Teacher Incentives for the District of Columbia Public Schools*. Washington: District of Columbia Schools, 1984.

Douglas, J. D. *Investigative Social Research*. Beverly Hills: Sage, 1976.

Douglas, Stratford, and Bird, Ronald E. *Personal Labor Supply: An Estimation of a Probabilistic Teacher Labor Supply Function*, Occasional Paper #16. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1985.

Dunne, F. "Liberal Arts Colleges and Teacher Quality (What--Waste Your Dartmouth Education on a Career in Teaching?)" *American Educator* 8 (Fall 1984): 18-21.

Education Commission of the States, Task Force on Education for Economic Growth. *Action for Excellence*. Denver: Education Commission of the States, 1983.

Educational Research Service. *ERS Report: Salaries Paid Professional Personnel in Public Schools, 1984-85*. Arlington: Educational Research Service, Inc., 1985.

Ehrenberg, Ronald. *The Demand for State and Local Government Employees*. Lexington, Massachusetts: D.C. Heath & Company, 1972.

________. "The Demand for State and Local Government Employees." *The American Economic Review* 63 (June 1973): 366-379.

Eldridge, H. M. *Teacher Supply and Demand in North Carolina*. Raleigh: North Carolina Department of Public Instruction, 1980.

Engler, Sheldon, and Sheffield, Steve. *Refinement, Validation, and Implementation of Education Manpower Systems*. Bureau of Economic and Business Research, University of Florida. Star #80-030 Final Report. Gainesville: University of Florida, 1981.

Falk, W. W., Falkowski, C., and Lyson, T. A. "Some Plan to be Teachers: Further Elaboration and Specification." *Sociology of Education* 54 (1981): 64-69.

Feistritzer, C. Emily. *The Making of a Teacher*. Washington: National Center for Education Information, 1984.

Feldstein, Paul J. *Health Care Economics*. New York: John Wiley & Sons, 1979.

Fielstra, C. "An Analysis of Factors Influencing the Decision to Become a Teacher." Journal of Educational Research 48 (1955): 659-667.

Florida Department of Education. Areas of Critical Teacher Need in Florida: 1980-81. Tallahassee: Department of Education, 1982.

Frataceia, E. V., and Hennington, I. "Satisfaction of Hygiene and Motivation Needs of Teachers Who Resigned From Teaching." Paper presented at the Annual Meeting of the Southwest Educational Research Association, Austin, Texas, 1982.

Freeman, Richard B. The Market for College-Trained Manpower. Cambridge: Harvard Press, 1971.

________. "Supply and Salary Adjustments to the Changing Science Manpower Market: Physics, 1964-1973." The American Economic Review 65 (March 1975): 27-39.

________. "Legal 'Cobwebs': A Recursive Model of the Market for Lawyers," Review of Economics and Statistics 57 (May 1975): 171-179.

________. "A Cobweb Model of the Supply and Starting Salary of New Engineers." Industrial and Labor Relations Review, 29, (January 1976): 236-248.

________. The Over-Educated American. New York: Academic Press, 1976.

Fresin, Al. Trends in Teacher Supply and Demand. Tallahassee: Florida Department of Education, 1980.

Freiberg, H. Jerome. "Master Teacher Programs: Lessons From the Past." Educational Leadership 42 (December 1984/ January 1985): 16-21.

Friedman, Milton, and Kuznets, Simon. Income From Independent Professional Practice. New York: National Bureau of Economic Research, 1945.

Froomkin, Joseph T., Jamison, Dean T., and Radner, Roy, editors. Education as an Industry. Cambridge, Massachusetts: National Bureau of Economic Research, 1976.

Galambos, Eva C. The Changing Market for Teachers in the South. Atlanta: Southern Regional Education Board, 1980.

________. *Teacher Preparation: The Anatomy of a College Degree*. Atlanta: Southern Regional Education Board, 1985.

Garfield, Haveman. *Earnings Capacity, Poverty, and Inequity*. New York: MacMillan, 1977.

Geertz, C. *Local Knowledge: Further Essays in Interpretive Anthropology*. New York: Basic Books, 1983.

Griliches, Zvi. "Distributed Lags: A Survey." *Econometrics* 35 (January 1976): 16-49.

Grossman, Michael. *The Demand for Health: A Theoretical and Empirical Investigation*. NBER Occasional Paper No. 119. New York: National Bureau of Economic Research, 1972.

Guthrie, James W., and Zusman, Ami. *Mathematics and Science Teacher Shortages: What Can California Do*? Berkeley: Institute of Governmental Studies, 1982.

________. "Teacher Supply and Demand in Mathematics and Science." *Phi Delta Kappan* 64 (1982): 28-33.

Hall, W. Clayton, and Carroll, Norman E. "The Effect of Terachers' Organizations on Salaries and Class Size." *Industrial and Labor Relations Review* (January 1973).

Hamermesh, Daniel S., ed. *Labor in the Public and Nonprofit Sectors*. Princeton, New Jersey: Princeton University Press, 1975.

Haubrich, V. F. "The Motives of Prospective Teachers." *Journal of Teacher Education* 11 (1960): 381-386.

Hay, George A., and Holt, Charles C. "A General Solution for Linear Decision Rules: An Optimal Dynamic Strategy Applicable Under Uncertainty." *Econometric* 43 (March 1975): 231-259.

Heckman, J. "The Common Structure of Statistical Models of Truncation; Sample Estimation for Such Models." *Annuals of Economic and Social Measurement* 5 (1976): 475-492.

________. "Sample Bias as a Specification Error." *Econometrics* 47 (1979): 153-162.

Helge, D., and Marrs, L. W. "Personnel Recruitment and Retention in Rural America." *Pointer* 26 (Winter 1982): 28-33.

Herriott, R. E., and Firestone, W. A. "Multisite Qualitative Policy Research: Optimizing Description Generalizability." Educational Researcher 12: 14-19.

Hopfengardner, J. D., Lasley, T., and Joseph, E. "Recruiting Preservice Teacher Education Students." Journal of Teacher Education 34 (1983): 10-13.

Horn, Robert N., McGuire, William J., and Tomkiewicz, Joseph. "Work Stoppages by Teachers: An Empirical Analysis." Journal of Labor Research 3 (Fall 1982): 487-496.

Houthakker, H. S. "Compensated Changes in Quantities and Qualities Consumed." Review of Economic Studies 19 (1952): 155-164.

Howe, Trevor G., and Gerlovich, Jack A. Critical Issues Dealing with the Supply and Demand for Science and Math Teachers. Chicago: National Science Teachers Association, 1982.

Hurd, Richard W. "Equilibrium Vacancies in a Labor Market Dominated by Nonprofit Firms: The 'Shortage' of Nurses." Review of Economics and Statistics 55 (May 1973): 234-240.

________. Improving Teacher Education: An Agenda for Higher Education and the Schools. Atlanta: Southern Regional Education Board, 1985.

Jamar, D., and Ervay, S. "The Effect of Teacher Education on the Career Goals of Women." Phi Delta Kappan 64 (April 1983): 593.

Jantzen, J. M. "Why College Students Choose To Teach: A Longitudinal Study." Journal of Teacher Education 32 (March-April 1081): 45-49.

Johnson, Susan Moore. "Merit Pay for Teachers: A Poor Prescription for Reform." Harvard Educational Review 54 (May 1984): 175-185.

Jones, James H. Teacher Supply and Demand in Mississippi. Jackson: Mississippi Department of Education, 1979.

Judge, G. G., et al. The Theory and Practice of Econometrics. New York: John Wiley & Sons, 1980.

Kershaw, Joseph A., and McKean, Roland N. Teacher Shortages and Salary Schedules. New York: McGraw-Hill, 1962.

Kessler, Sid. "Comparability." Oxford Bulletin of Economics and Statistics 45 (February 1983): 85-104.

Killingsworth, M. R. Labor Supply. Cambridge: Harvard University Press, 1983.

Koerner, J. D. Miseducation of American Teachers. Boston: Houghton-Mifflin, 1963.

Lancaster, K. J. "A New Approach to Consumer Theory." Journal of Political Economy 74 (April 1966): 132-156.

Landon, John H., and Baird, Robert N. "Monopsony in the Market for Public School Teachers." The American Economic Review 61 (December 1971): 966-971.

Lee, J. F., and Pruitt, W. "High School Teaching: A Humiliating Profession." The Clearinghouse 53: 195-197.

Lewis, H. G. "Interest del Empleador en Las Horas de Trabajo Del Empleado" (Employer Interest in Employee Hours of Work): Cuadernos de Economica, Catholic University Chile, 1969.

Link, Charles R., and Landon, John H. "Monopsony and Union Power in the Market for Nurses," Southern Economic Journal 41 (April 1975): 649-659.

Lortie, D. C. School Teachers: A Sociological Study. Chicago: University of Chicago Press, 1975.

Louisiana Department of Education. "Declining Teacher Supply." Baton Rouge: Department of Education, 1982. (Mimeographed)

Mabry, Rodney B., et al. A Study of Teacher Fringe Benefits. Research Triangle Park, NC: Southeastern Regional Council for Educational Improvement, 1985.

Mangieri, John N., and Kemper, Richard E. Factors Related to High School Students' Interest in Teaching as a Profession. Fort Worth: Texas Christian University, (monograph) 1984.

Mead, R. D. "A Teacher's Tale: Why We Are Miserable." The American School Board Journal (1980): 37-40.

Miller, Robert A. "Job Matching and Occupational Choice." Journal of Political Economy 92 (December 1984): 1086-1120.

Murnane, Richard J. "Teacher Mobility Revisited." Journal of Human Resources, 16, (Winter 1981): 3-19.

Murphy, J. T. Getting the Facts: A Fieldwork Guide for Evaluators and Policy Analysis. Glenview, Illinois: Scott Foresman, 1980.

Muth, R. F. "Household Production and Consumer Demand Functions." Econometrics 34 (July 1966): 699-708.

National Center for Education Statistics. New Teachers in the Job Market. Washington: U.S. Department of Education, 1980.

________. Projections of Education Statistics to 1988-89. Washington: U. S. Department of Education, 1981.

________. Survey of Teacher Demand and Shortage. Washington: U.S. Department of Education, 1981.

________. The Condition of Education. Washington: U.S. Department of Education, 1982.

________. Projection of Education Statistics to 1990-91. Washington: U.S. Department of Education, 1982.

________. Survey of Teacher Demand and Shortage. Washington: U.S. Department of Education, 1982.

________. Teachers Employed in Public Schools, 1979-80. (Special Report) Washington: U.S. Department of Education, 1982.

________. The Condition of Education, 1983 Edition. Washington: U.S. Department of Education, 1983.

________. New Teachers in the Job Market, 1981 Update. Washington: U.S. Department of Education, 1983.

________. Digest of Education Statistics, 1983-84. Washington: U.S. Department of Education, 1984.

National Commission on Excellence in Education. A Nation at Risk: The Imperative for Educational Reform. Washington: U.S. Department of Education, 1983.

National Education Association, Research Division. Teacher Supply and Demand in Public Schools. Washington, D.C. Issued yearly (1979-1983).

Northeast Regional Exchange. Education Under Study: An Analysis of Major Reports on Education. Chelmsford, Massachusetts: Northeast Regional Exchange, 1983.

Page, J., and Page, F. High School Seniors' Perceptions of Teaching as a Career Opportunity. Statesboro, Georgia: Georgia Southern University, 1984.

Patton, Frances G. Good Morning, Miss Dove. New York: Dodd, Mead, and Company, 1954.

Polachek, Solomon W. "Occupational Self-Selection: A Human Capital Approach to Sex Differences in Occupational Structure." The Review of Economics and Statistics 63 (February 1981): 60-69.

Richards, R. "Prospective Students' Attitudes Toward Teaching." Journal of Teacher Education 11 (1960): 375-380.

Roberson, S. D., et al. "Now Who Aspires to Teach." Educational Research 12 (June-July 1983): 13-21.

Rosen, S. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition." Journal of Political Economy 82 (1974): 34-55.

Rosenholtz, S. J. "Political Myths About Education Reform: Lessons from Research on Teaching." Phi Delta Kappan 66 (January 1985): 349-355.

Roth, Robert A. "Comparison of Methods and Results of Major Teacher Supply and Demand Studies." Journal of Teacher Education 32 (November-December 1981): 43-46.

Rumberger, Russell W. Is There Really a Shortage of Mathematics and Science Teachers? A Review of the Evidence. Stanford, CA: Institute for Research on Educational Finance and Governance, Project Report No. 84-A26, November 1984.

Schlechty, Phillip, and Joslin, Anne. "Recruiting Teachers--Future Prospects." Journal of Children in Contemporary Society 16 (Spring-Summer 1984): 51-60.

Schlechty, Phillip, and Vance, Victor. "Do Academically Able Teachers Leave Education? The North Carolina Case." Phi Delta Kappan 63 (October 1981): 106-112.

________. "The Distribution of Academic Ability in the Teaching Force: Policy Implications." Phi Delta Kappan 64 (September 1982): 22-27.

________. "Recruitment, Selection, and Retention: The Shape of the Teaching Force." *Elementary School Journal* 64 (March 1983): 469-487.

Schmid, Rex. *Final Report: Model Manpower Information System for Educational Personnel*. Gainesville: University of Florida, 1980.

Schmidt, Peter, and Strauss, Robert R. "The Prediction of Occupation Using Multiple Logit Models." *International Economic Review* 16 (June 1975): 471-486.

Schwarzweller, H. K., and Lyson, T. A. "Some Plan To Be Teachers: Determinants of Career Specification Among Rural Youth in Norway, Germany, and the United States." *Sociology of Education* 41 29-43.

Sietsema, John. *Teacher Layoffs, Shortages in 1979 Small Compared to Total Employed*. (Special Report) Washington: National Center for Education Statistics, 1981.

Sloan, Frank A., and Richopan, Somchai. "Short-Run Supply Responses of Professional Nurses: A Microanalysis." *The Journal of Human Resources* 10 (Spring 1975): 241-257.

Sloan, Frank A., and Steinwald, Bruce. *Hospital Labor Markets*. Lexington, Massachusetts: D. C. Heath & Company, 1980.

Snyder, Harry M. *A Study of Teacher Education in Kentucky*. Frankfort: Council on Higher Education, 1980.

Spooner, William E. *North Carolina Science Teacher Profile*. Raleigh: North Carolina Department of Public Instruction, 1982.

Sykes, G. "Contradictions, Ironies, Promises Unfulfilled: A Contemporary Account of the Status of Teaching." *Phi Delta Kappan* 65 (October 1983): 87-93.

Tennessee Higher Education Commission. *A Study of Teacher Education in Tennessee*. Nashville: Tennessee Higher Education Commission, 1982.

Thomas, R. B. "The Supply of Graduates to School Teaching." *British Journal of Industrial Relations* 13 (March 1975): 107-114.

Thornton, Robert J. "Monopsony and Teachers' Salaries: Some Contrary Evidence; Comment," with "Reply" by John Landon and Robert Baird. *Industrial and Labor Relations Review* 28 (July 1975): 574-577.

________. "The Elasticity of Demand for Public School Teachers." Industrial Relations 18 (Winter 1979).

Turnbull, P., and Williams, G. "Supply and Demand in the Labor Market for Teachers: Qualification Differentials in Teachers' Pay." British Journal of Industrial Relations 13 (July 1975): 215-222.

U.S. General Accounting Office. New Directions for Federal Programs to Aid Mathematics and Science Teaching. Washington: GAO/PEMD-84-5, March 1984.

U.S. House of Representatives, Committee on Education and Labor. Merit Pay Task Force Report. Washington: U.S. Government Printing Office, 1983.

Walker, R. "The Conduct of Educational Case Studies: Ethics, Theory, and Procedures," in W. B. Dockrell & D. Hamilton (eds.), Rethinking Educational Research. Great Britain: Hoddle & Stoughton, 1980.

Waller, W. The Sociology of Teaching. New York: Russell and Russell (originally published in 1932), 1965.

Weaver, Timothy W. "In Search of Quality: The Need for Talent in Teaching." Phi Delta Kappan 61 (September 1979): 29-33.

________. "The Talent Pool in Teacher Education." Journal of Teacher Education 32 (May-June 1981): 32-36.

________. America's Teacher Quality Problem: Alternatives for Reform. New York: Praeger, 1983.

________. "Solving the Problem of Teacher Quality, Parts 1 and 2." Phi Delta Kappan 66 (October and November 1984): 108-115, 185-191.

Wentzler, Nancy. "Locational Variations in the Public School Teacher Supply Price." Public Finance Quarterly 9 (October 1981).

Wilcox, K. The Ethnography of Schooling: Implications for Educational Policy-Making. Stanford, CA: Institute for Research on Educational Finance and Governance, Project Report No. 80-A 1B, 1980.

Wimpelberg, R., and King, J. A. "Rethinking Teacher Recruitment." Journal of Teacher Education 34 (January-February 1984): 5-8.

Woo, Couisk. The Shortage of Mathematics and Science Teachers: Lessons from Higher Education. Stanford CA: Institute for Research on Educational Finance and Governance, Project Report No. 84-A23, November 1984.

Wood, K. E. "What Motivates Students To Teach?" Journal of Teacher Education 29: 48-50.

Wright, B. P. "Our Reason for Teaching." Theory Into Practice 16 (1977): 225-230.

Yett, Donald E. An Economic Analysis of the Nurse Shortage. Lexington, MA: D. C. Heath & Company, 1975.

Yett, Donald E., et al. A Forecasting and Simulation Model of the Heath Care Sector. Lexington, MA: D. C. Heath & Company, 1979.

Zabalza, Antoni. "The Determinants of Teacher Supply." Review of Economic Studies 46 (January 1979): 131-147.

Zabalza, Antoni, Turnbull, Philip, and Williams, Gareth. The Economics of Teacher Supply, with an epilogue, "Some Transatlantic Comparisons," by Mary Jean Bowman. Cambridge: Cambridge University Press, 1979.

Zarkin, Gary. "Occupational Choice: An Application to the Market for Public School Teachers." Unpublished Paper, November 1982.